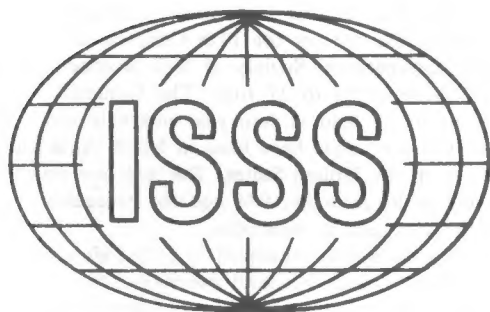


FOLIO

THE UNIVERSITY OF ALBERTA STAFF BULLETIN
EDMONTON, ALBERTA, 15 JUNE 1978



11th Congress of the International Society of Soil Science

Dear Member-Delegate,

Folio is a weekly publication of the University of Alberta that goes to the University's staff as well as to other Albertans interested in the role of the University and its activities in the life of the province.

By happy coincidence, the 11th Congress of the International Society of Soil Science is being held at the University of Alberta in 1978, and during the year the Department of Soil Science of this University will commence its sixtieth year of operation. It therefore seemed appropriate to the Organizing Committee for the Congress that there be a special issue of *Folio* to mark this unique occasion.

We hope this special publication will provide Congress participants, as well as the University community, and the University's constituents with instructive accounts of the roles and activities of soil scientists in Alberta during the past sixty-odd years.

C. F. Bentley

C.F. Bentley, Chairman,
Organizing Committee,
11th ISSS Congress



Dear Delegate,

It is with the greatest pleasure that I welcome you, in the name of the University of Alberta, to the 11th Congress for the International Society of Soil Science. It is my sincere hope that you will find the visit intellectually stimulating and personally rewarding.

We are proud of our University and hope that you will find the time to see something of it and to mix with some of our people. I feel certain that your visit to our Campus will prove to be an enriching experience for us all.

Harry E. Gunning

Harry E. Gunning
President



Dear Delegate,

It gives me a great deal of pleasure to welcome delegates to the 1978 Conference of the International Society of Soil Science.

As Chancellor and Chairman of the Senate, it is my particular concern to represent the interests of the people of Alberta at their largest University. Your presence here, as well as the range and depth of your activities, serves to remind all of us that a great institution of learning exists not only to serve the needs of the public but also to be part of the national and international process of intellectual discovery.

On behalf of the University, I wish you a useful and stimulating experience throughout your deliberations and hope you will find your visit to Edmonton and to the University an enjoyable and memorable experience.

Yours sincerely,

R.N. Dalby

R.N. Dalby
Chancellor and Chairman of the Senate





Dear Member-Delegate,

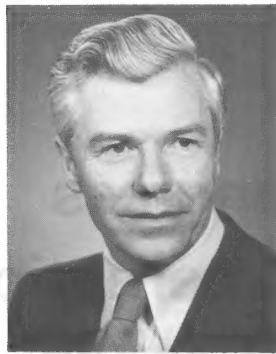
It is with a great deal of pleasure and honour that I, on behalf of Canadian soil scientists, welcome you to the 11th Congress of the International Society of Soil Science.

Canadian soil scientists are spread widely across this large country and the preparation for hosting this Congress has brought together and strengthened the Canadian Society of Soil Science. We are indeed pleased to be your host and we hope that you find the Congress provides scientific stimulation and exciting new contacts.

Your presence with us is an enriching opportunity and we hope we can get to know each other better.

G.C. Topp

G.C. Topp
President
Canadian Society of Soil Science



Dear Delegate,

It is my pleasure to welcome you on behalf of the Faculty of Agriculture and Forestry of the University of Alberta to the 11th International Society of Soil Science Congress. Our Faculty is relatively young by world standards, having been established in 1915. Soil Science has been an integral part of the Faculty almost from the beginning and we are proud of the accomplishments of the soil scientists who have been and still are members of our staff. As a combined Faculty of Agriculture and Forestry, we are unique in Canada and believe that the combination of the two major renewable resources adds strength to our teaching, research, and extension programs.

On behalf of the Faculty, I wish you a stimulating and interesting experience throughout your program. We hope that you will take the opportunity to visit with members of other disciplines in the Faculty in addition to those in the area of soil science. As a Faculty, we look forward to your presence on campus.

Sincerely,

J.P. Bowland

J.P. Bowland, P.Ag., F.A.I.C.
Dean, Faculty of Agriculture and Forestry

International Soil Science Congress 1978

At the invitation of the Canadian Society of Soil Science, the University of Alberta will be the site for the 11th Congress of the International Society of Soil Science (ISSS) from 19 to 27 June. The Congress is normally held at four-year intervals and only two of them have been in North America, both in the United States. The last one was held in Moscow in 1974 and the preceding one was held in Australia.

The ISSS was organized in 1924. Most of its four to five thousand members are university graduates, but anyone interested in soil science can become a member. The majority of the members are employed in business, public agencies, or universities, and some are farm managers. It is expected that, this year, about one thousand delegates with five hundred spouses and children will attend the Edmonton Congress.

The Congress is vital and serves several important purposes. World attention has focussed on the fact that food production must be doubled by the year 2000. If that goal is to be met, new lands will have to be developed for food production and yields on currently farmed lands will have to increase too. Many scientific disciplines will be involved in this task, but it is the soil scientist who will have the central role since it is he who must identify new lands suited to reliable, viable agricultural production.

Thus, through the Congress, soil scientists visit other places and have an opportunity to see and discuss first-hand what fellow scientists have learned about the characteristics, limitations, use, and the wise management of soils and agricultural land. Soil scientists in the host country, moreover, have the unique opportunity of discussing their work and problems with specialists the world over. Such exchanges promote early adoption and application by practical farmers of the newest soil science knowledge that is relevant to their specific farming conditions.

The problems of land use, of fertilization for better yields and irrigation to increase the yield, and the reliability of crop production are global and of great importance to Canada. Scarcity of good-quality land in this country has resulted in several Canadian provinces passing legislation to control the ownership and relegate the use of farm lands. Additionally, the fertilizer industry is now big business for all concerned—those who produce fertilizers, those who distribute them, and the farmers who apply them.

With these foregoing factors in mind, the 11th ISSS Congress has chosen a practical

FOLIO

THE UNIVERSITY OF ALBERTA, EDMONTON, ALBERTA

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434 Athabasca Hall, The University of Alberta
Printed by Printing Services
Photographic lab work by Technical Services

theme: "Optimum soil utilization systems under differing climatic restraints." At plenary sessions, symposia, and technical sessions in seven commissions (or sections), about four hundred speakers will discuss various aspects of that theme.

The program

Plenary Sessions. Each day, the Congress will begin with a plenary session in the Northern Alberta Jubilee Auditorium at 8:30 a.m. The first will comprise opening ceremonies and an address on the topic of soil resources of Canada by the President of the Society, C. Fred Bentley of the Department of Soil Science at this University.

Five plenary sessions will be devoted to the major climatic regions and invited speakers will document, for each of the regions, their significant limitations for food production and the overriding climatic restraints. Further, dominant farming systems will be compared to optimum uses of the soils concerned. Invited specialists of international stature will discuss these topics for each of the five major climatic regions: polar (tundra and far north regions), humid microthermal (like much of Canada's agricultural areas), humid mesothermal (like much of the southeastern United States), dry desert and steppe (the semi-arid tropics), and rainy tropical (the tropical rain forest areas).

Symposia. Six symposia, two on each of three afternoons, have been planned. Each symposium will feature two invited papers to be followed by submitted papers selected for their direct relationship to the theme of the symposium concerned. The themes are: isotopes in action, resource information systems, soil deterioration and reclamation, utilization of northern Canadian soils, soil structure, and the long-term outlook regarding soil/climate interrelationships.

Commission meetings. The Society will have seven Commissions or specialized sub-divisions. They will deal with topics of high current interest to soil scientists and supporting the general Congress theme. Some of these sessions will be able to accommodate papers submitted on topics of general interest. Preference will be given to papers submitted on the general topics of soil physics; soil chemistry; soil biology; soil fertility and plant nutrition; soil genesis, classification, and cartography; soil technology; and soil mineralogy.

All papers presented at the plenary and symposia sessions will be printed in their entirety and in the original language. Each will have an abstract printed in all three official languages of the Congress (English, French, and German) and may be purchased at a cost of \$4 per copy. Abstracts of

volunteered papers presented in Commission sessions will be published in the three languages together with the names and addresses of their authors. This volume of transactions will also be available at a price of \$4 per copy.

Tours. The Congress will be preceded and followed by numerous field tours that will range from Nova Scotia to Vancouver Island. On these tours, visitors will see and learn about many of Canada's most important soils. This will give our own soil scientists opportunities to discuss Canadian soil problems with experts from many countries. In turn, visitors will have an exceptional opportunity to see first-hand the tremendous diversity of Canada's landscapes and how the Canadian people have adapted to them.

In addition to examining specific soils and their uses, the agricultural or forestry practices of each area will be examined closely and visitors will be provided with specific information about such things as representative yields, common cropping practices, fertilizer usage and returns therefrom, and soil conservation practices. Alternative land uses for wildlife, recreation, and forestry will also be discussed and documented.

Displays. Displays will be an important feature of the Congress. In fact, they will be so extensive that a gymnasium and an adjacent parking lot at the University have been reserved for them. A major emphasis will be placed on soil science and soil monoliths. Most of the latter will be used to illustrate the Canadian System of Soil Classification and will be taken from soil profile pits where the various Congress tours will stop to examine typical Canadian soils and their associated land uses. Provincial displays will feature land characteristics and uses in the major agricultural regions of Canada. Soil testing in the Prairie Provinces will be the subject of an important display and will most definitely be of interest to both gardeners and farmers.

The general public as well as Congress participants are invited to visit the displays. Therefore, to broaden the interest of the non-technical visitor, there will be a variety of other displays; colored slides will illustrate Canadian soil, landscapes, mountain scenery, and land uses. Duplicates of the slides will be on sale. Some permanent semi-trailer "museumobiles" of the National Museum as well as similar units from the Devonian Foundation, Calgary, will be stationed in the parking lot where equipment and some machinery will be exhibited.

An extensive assembly of publications related to soil management, soil surveys, problem soils, and other soil-related

agricultural publications will accompany the provincial displays. The world soil map recently prepared by the Food and Agriculture Organization in cooperation with UNESCO will be shown as will films related to soil science. One highlight will be the premiere of a new work titled *The Soils of Canada*. Membership in the ISSS is open to anyone interested in soil science. Membership fees are very modest—only \$3 (US) per year. Anyone interested in participating in the Congress or joining one of the tours is invited to contact J.A. Toogood, Department of Soil Science, telephone 432-3417.

Canadian Society of Soil Science

By M. Schnitzer

Soil Science as a scientific discipline in Canada began in the early 1900s with the Chemistry Division at the Central Experimental Farm in Ottawa and with the Ontario Agricultural College at Guelph. By the early 1920s, Departments of Soil Science have been established in the Universities of Manitoba, Saskatchewan, and Alberta. The first national organization was the Soils Group, which was formed in 1932 by interested members of the Canadian Society of Technical Agriculturists, and it is now known as the Agricultural Institute of Canada. The Canadian Society of Soil Science was formally instituted in 1954. Its major objectives are to provide a forum for communication among scientists representing all branches of soil science. The Society now has approximately 350 members. Its principal publication is the *Canadian Journal of Soil Science*, published in four issues each year, which contains close to one hundred scientific papers. The *Journal* has a wide national and international distribution, and is mailed to almost sixty foreign countries. The Society holds annual meetings at which scientific papers are presented. In recent years, a number of symposia on topics of special concern to Canada have been held in conjunction with these meetings. Proceedings of the annual meetings are published regularly.

One of the most distinguishing features of Canadian soil science studies is the high degree of cooperation between the federal government, the provincial governments, and the universities. This cooperation goes back many years. Organized, cooperative soil-survey activities were initiated in the mid 1930s. In 1940, the National Soil Survey Committee was formed and charged with coordinating and correlating soil-survey activities across the country. These activities, expanded in recent years, have as their major objective the development, by scientific methods, of a

sound knowledge of the soil resources of Canada so that these can be used efficiently, not only for the production of crops, but also for wildlife, recreation, and conservation purposes.

On the scientific side, Canadian soil scientists have, over the years, made significant contributions to soil genesis, especially concerning the podzolization process, humus chemistry, soil physical chemistry, soil physics, mineralogy, and microbiology. Nor have the practical aspects of soil science been neglected. Notable contributions have been made in the areas of strip farming, trash cover, N, P, K, and S fertilization, irrigation management, crop rotations, and remote-sensing surveys. The dollar value of these contributions to Canadian agriculture and to the national economy has been very substantial. During the past thirty years, crop production in Canada on the average has more than doubled, and soil scientists have played an important role in bringing this about. A recent study in Western Canada has shown that improved soil management, and in particular fertilizer usage based on soil test guidelines, has been responsible for in excess of eighty percent of the cereal grain yield increase that has occurred.

In contrast to many other countries, large tracts of marginal soils can still be found in all regions of Canada which are currently not used for any productive purposes. As the population and the resulting pressure on class 1 and 2 soils near large urban centers increase, it may become necessary, in spite of strenuous efforts to direct urban and industrial expansion to poorer soils, to start agricultural production on marginal soils. Canadian soil scientists will have a major responsibility in advising farmers on how to handle these soils and how to increase agricultural productivity on soils already in use. Judging from their performance in the past, Canadians can be confident that their soil scientists will be equal to the task.

At this time, the Canadian Society of Soil Science is attempting to broaden the scope of its interests and activities to include not only agricultural but also forestry, environmental, and geographic aspects of soil science.

Canadian soil scientists are proud to host the 11th Congress of the International Society of Soil Science at Edmonton. Hopefully, participants of the Congress will take advantage of the many opportunities that are available to have a good look at this vast and beautiful country.

Displays at the 11th ISSS Congress

The extensive displays at the Congress will be open without charge to members of the University community and the general public as well as to the Congress participants.

For this reason, the display locations have been selected so as to maximize convenience, especially for the general public.

The Education Building Gymnasium will house a highly varied array of displays related to land, its characteristics, and uses in Canada. The core of that display area will be a presentation of thirty to forty panels with examples and explanations of the System of Soil Classification for Canada. Provincial governments are each focussing their displays on land use in their respective areas. An extensive forestry display will provide information about features of that industry and its use of land. Other major features in the Gymnasium will include soil testing, reclamation problems and techniques, applied, as well as technical literature regarding soil and soil management in Canada, Canada Environment Land's Directorate Display, a display on soil salinity, a cartographic display, world soil maps, and a variety of films.

Two "museumobiles" from Canada's National Museum will be the main attraction in the parking lot beside the Education Building Gymnasium. One "museumobile" is titled "Atlantic Canada"; the second unit, "Canada North," will feature aspects of the colder areas. The same display area will have some types of equipment used in field investigations of soils or for soil management experimentation.

Just to the east of the Northern Alberta Jubilee Auditorium the Devonian Foundation "museumobiles" will constitute another extensive and interesting array of museum materials. There will be nine separate huge trailers that will include: an historical display about the RCMP; a unit about wildlife (sixty animals and birds) and wildlife conservation (endangered and extinct species); a display of mineralogy (with four to five hundred rock and mineral specimens); an art gallery of work by native Canadians, Eskimos, and northwest Indians; and an historical "old toys" display. At the Alberta Provincial Museum there will be: a display about ethnic groups in Alberta and their contributions to the province; a display on "Preserving our heritage"—a conservation theme; one on vanishing cultures (South American Indian, Bushmen, and other aboriginal peoples); and a fur-trading display.

Technical equipment displays, arranged by commercial companies, will be of special

interest to Congress participants and can be viewed in the lower lobby of the Northern Alberta Jubilee Auditorium.

The Organizing Committee solicits the assistance of all readers in publicizing the fact that the Congress displays will be open to the general public without charge commencing 20 June, Tuesday at 10 a.m. through 25 June, Sunday.

Soil Science in Canadian and Alberta Forestry

Silviculturists introduced soil science to Canadian forestry in a small way during the 1930s and 1940s. An organized approach to forest land classification began in the early 1960s under the auspices of the Canada Land Inventory. This approach developed interest in forest soils work in the more southerly forests of Canada and stimulated forest soils work in provincial forestry and university agencies. The Canada Land Inventory also led to attempts at development of integrated soil and vegetation classification. Integrated ecological surveys are in progress in British Columbia, Alberta, Manitoba, and the Northwest Territories. In addition, much forest soil information is being obtained by the federal and provincial soil survey agencies throughout Canada. Research groups are working on soil fertility, nutrient cycling, nitrification, regeneration, impact of forest practices, and microbiological studies.

The Northern Forest Research Centre, Edmonton, provides examples of current projects relating to forest soils and non-forested soil areas of Northern Canada:

1. *Land Classification*

(a) Ecological (biophysical) land classification of Banff and Jasper National Parks, Alberta: This project is an integration of land forms, soils, vegetation, and wildlife into a comprehensive land-classification system. The results are to be used in master planning of the Parks from specific site development to regional land use and conservation zoning.

(b) Northern soils: Soils, vegetation, permafrost, and their interrelationships are being investigated in various Arctic and Subarctic regions of the Northwest Territories. These studies, in cooperation with the Soil Survey of Canada, led to the development of the Cryosolic Order, permitting a rational description of northern soils. The significance of frost-induced microtopography in terms of subsurface ice accumulation and frost heaving is determined in relation to vegetation cover. These studies provide information on anticipated consequences of differences in sensitivity of the terrain to disturbance. Recommendations

Research Centres




Agriculture

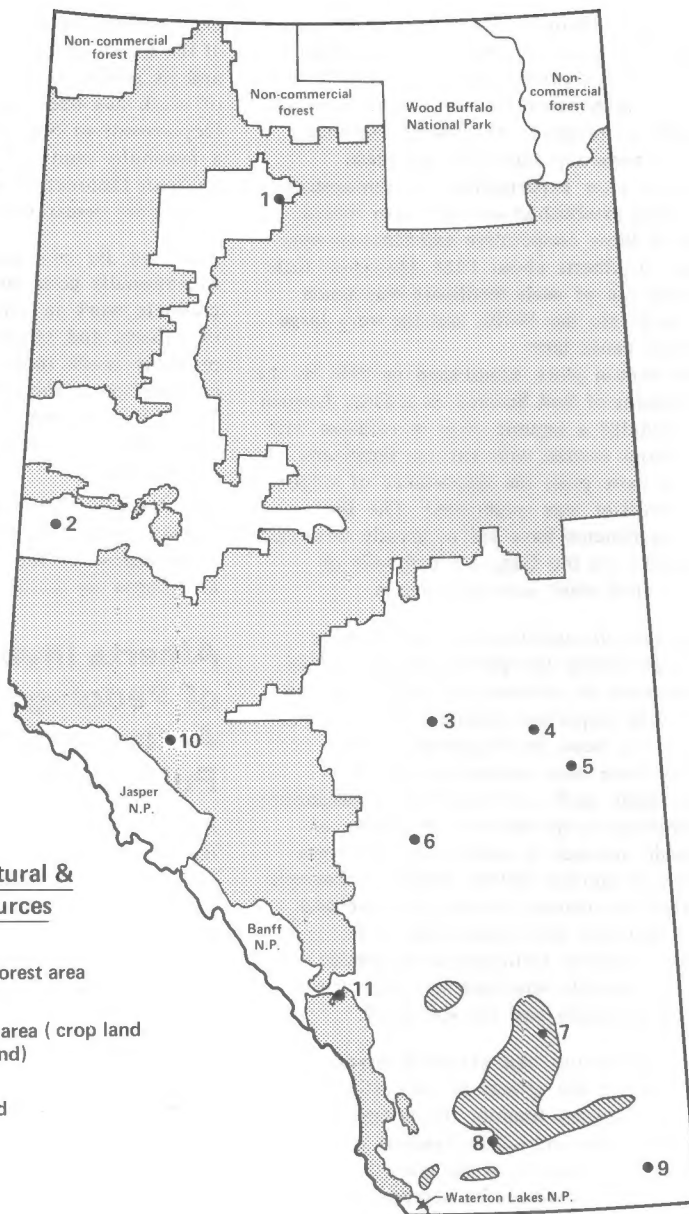
1. Ft. Vermilion
2. Beaverlodge
3. Edmonton
4. Vegreville
5. Kinsella
6. Lacombe
7. Brooks
8. Lethbridge
9. Manyberries

Forestry

3. Edmonton
10. Hinton
11. Kananaskis

Alberta Agricultural & Forestry Resources

-  Productive forest area
-  Agricultural area (crop land and range land)
-  Irrigated land



are made to avoid or minimize damage to terrestrial ecosystems.

(c) Biogeoclimatic forest ecosystem classification in Alberta: This system considers all aspects of nature, such as climate, vegetation, soil, geological substratum, shape of the terrain, wildlife, and soil organisms. The biogeoclimatic ecosystem classification of Alberta started in 1976. The objective of the project is to develop a classification of forest ecosystems that will allow forest managers to improve site-specific management of forests in the province.

2. Forest Soil Fertility

Forest nursery soils: Silvicultural prescriptions

include provision of advisory service to producers of bare root and container seedlings, nutrient requirements of coniferous seedlings in containers and conventional nurseries, the effects of soil amendments and timing of fertilization on growth of conifer seedlings, greenhouse experiments on the effects of nitrogen source and spacing on growth of coniferous seedlings, movement of nutrients in nursery soils, and effects of salt water spills on forested and agricultural land.

3. Pollution

(a) Heavy metals: Studies on the effects of heavy metal pollutants on plant-soil

relationships were initiated in 1977. The present focus of research is on availability of metals to plants and the movement of metals in soil profiles.

(b) Air pollution impact: The soils work dealing with the detection and assessment of air pollution impact on forests in the Athabasca Oil Sands Area has concentrated mainly on description and classification of specific upland biomonitoring plots. Some soil nutrient analyses have been completed in order to separate soil from atmospheric factors related to pollutant concentration in vegetation samples.

(c) Impact of pollutants on nutrient status: The effects of atmospheric pollutants (SO_2 and other S compounds) and heavy metals on the nutrient status of soils are being examined. The nutrient status and alteration brought about both by direct and indirect atmospheric pollutants on conifer growth (jack pine) is also of major interest. Both soil and conifer nutrient compositional changes in response to atmospheric pollution are used to measure the intensity of effects.

4. Soil Service Laboratory

This regional soil service laboratory was initiated in 1966 for analyses of soil, plant, and water samples. Samples are from various research programs in agricultural areas, shelterbelts, tree nurseries, and forests.

As the map on this page shows, a large productive forest area exists in Alberta. Research on the soil resources is one of the important aspects in wise planning for development of such a large area. The disciplines of forestry and soil science are working together to ensure wise development and use of such renewable resources.

Some Alberta Contributions to the Development of Soil Science in Canada

By J.D. Newton

Origins of Soil Science In Canada and Alberta

In Canada, soil science was taught in colleges and faculties of agriculture before special departments of soil science were established, and many examples could be given of important research in soil science and fertility by Canadian colleges or universities and the Federal Department of Agriculture before departments of soil science were established.

The first university Departments of Soils (as they were then called) were established at the University of Alberta in 1919 with F.A. Wyatt as Head, and at the University of Saskatchewan, with Roy Hansen in charge.

The persons mainly responsible for establishing the Department of Soil Science at the University of Alberta in 1919 were: firstly, the Dean of the Faculty of Agriculture, E.A. Howes, who realized the desirability of such a department and was especially alarmed by the extent of wind erosion that had already taken place in southern Alberta; and second, the first Head of the Department, F.A. Wyatt, who started and developed the Department.

F.A. Wyatt came to the University from the University of Illinois in 1919, and remained Head of the Department until his death in 1947. J.D. Newton was appointed Associate Professor in 1922 and succeeded F.A. Wyatt in 1947. He was a graduate of the Universities of McGill and California. The succeeding Heads have been graduates of the Universities of Alberta and Minnesota. J.A. Toogood, who joined the Department in 1948, succeeded J.D. Newton as Head in 1959, and S. Pawluk succeeded by J.A. Toogood in 1974. C.F. Bentley joined the Department in 1946 and was appointed Dean of the Faculty of Agriculture in 1959.

Major Emphasis of the Department and Contributions Up to 1959

The Soil survey of Alberta: a combined effort and an important achievement.

The practical importance of soil classification has been recognized for many years by those concerned with the intelligent use of our land resources. The only way to classify soils satisfactorily is to go over the land systematically, taking notes on the soils and environment, and taking soil samples for analysis. However, it is important to realize that, apart from practical considerations, soil classification is in itself an exceedingly interesting subject because it includes a study of factors such as parent material, topography, climate, natural vegetation, and age, which have determined the character of the soil.

The main agricultural areas of the province have been covered by soil surveys, and exploratory surveys, mainly by helicopters, have covered the largely non-agricultural lands of north-eastern Alberta. It is, of course, true that soil surveys must be continued in many areas that have already been covered in order to classify the soils in greater detail.

In connection with these surveys, the cooperation of the University of Alberta, the Research Council of Alberta, and the Federal Department of Agriculture, under the Alberta Soil Survey Committee, represents a good example of the close cooperation between university, provincial, and federal agencies. (See the special article on Soil Survey on page 8 of this issue of "Folio.")

The use of commercial fertilizers in the Prairie Provinces: an important development

The use of inorganic commercial fertilizers has been responsible for very large increases in yields of crops in the Prairie Provinces. Farmers generally started to use these fertilizers after experimental or demonstration plots were established on their own farms. Some of these cooperative experiments were started in Alberta about 1928. However, little practical use of such fertilizers was made until well into the 1930s, and the very large increases came later.

The Breton plots, established in 1930 by the Department of Soil Science on a Gray Luvisol soil, included a legume crop in rotation with grain crops treated with various fertilizers, and on these plots the importance of sulphur as a fertilizer was established. The Breton plot experiments have led to greatly increased production on the Gray Luvisol soils of Alberta and other parts of Canada.

Some basic investigations of soil fertility

Although testing the effects of applications of fertilizers to various soils and crops has given very important practical information, some more basic investigations of soil fertility have been carried out by the Department, such as: numerous investigations of nitrification (production of soluble or available nitrogen in soils) under different crops and summer fallow; studies of bacteria involved in nitrogen fixation (legume and non-symbiotic); and experiments with "tagged" sulphur fertilizers to determine the relative amounts absorbed by crops from applied fertilizers and the soil itself.

Soil deterioration. An extensive investigation was made of the effects of cultivation and cropping systems (mainly the commonly practised grain-and-fallow system) on the chemical composition of the soils of the three Prairie Provinces by comparing the composition of virgin and adjacent cultivated soils. The average loss in percentage of organic matter and nitrogen from the surface in six inches of Brown, Dark Brown, and Black soil zone soils were much alike and serious, amounting to about nineteen percent of the original content in the average period of twenty-two years.

Soil erosion. Extensive wind erosion of soils was observed, especially in southern Alberta even before 1920, and its extent was later noted by soil surveyors. A few graduate students worked on the problem. Some experimental plot work on water erosion was done by the Department because water erosion of soil is often serious in Alberta.

Irrigation. While most of the important

experimental work on irrigation has been done at the Lethbridge Agricultural Research Station and its substations, a relatively small amount of work has been directed by the University Department of Soil Science. This has included a feasibility study of using the extensive hardpan (Solonetzic) soils for irrigation and other joint research projects.

Teaching. By encouraging a number of exceptionally good students to take post-graduate work in soil science, the University of Alberta and other universities have probably made their most important contribution to the development of soil science. The value of their contributions is inestimable as their activities are now world-wide.

Dr. Newton, Professor Emeritus of Soil Science, retired in 1959 and discusses contributions of the Soil Science Department in Alberta up to that time.

Alberta Institute of Pedology Active in Extension Publications

By W. G. Lamble
Faculty of Extension

Extension publications such as Soil Survey Reports, maps, and other reports are among the valued services of the Alberta Institute of Pedology. The Institute is an organization of soil scientists located at the University of Alberta who are variously attached to the federal and provincial government agencies and to the University. It provides for coordination among these people and their agencies as they engage in their research, teaching, and extension activities.

Most of the extension publications prepared by members of the Institute are published through the Faculty of Extension under guidelines established in cooperation with the Faculty of Agriculture and Forestry. These two Faculties have refined and formalized their policies and program procedures for agricultural extension. The guidelines established for extension publications are designed to facilitate the publication of information that is new, relevant to identifiable groups of readers, and is not available elsewhere.

Inter-Agency Cooperation

Over the years, the Alberta Institute of Pedology has been a very large contributor to extension publications. These publications reflect the inter-agency cooperation characteristics of the Institute. Authors have

come from the Soils Division of the Research Council of Alberta, the Alberta Pedology Section of the Soil Research Institute of Agriculture Canada, and the Department of Soil Science of the University of Alberta.

The publications have also taken a variety of formats and topics for various audiences. For example, some publications are of a technical nature prepared especially for the professional soils teacher or extension educator. Others are of more general interest such as to the home gardener. Several items have also been designed for the high school student.

A Popular Periodical

A primary vehicle for the dissemination of information about agricultural and forestry research, education, and related activities at the University is the *Agriculture and Forestry Bulletin*. This is a quarterly, magazine-format publication which currently has a circulation of 16,000 copies per issue. While most subscribers are Albertans, an increasing number are from other parts of Canada and many other countries around the world. Soil scientists have been major contributors to the *Bulletin* with an average of at least one article per issue on a variety of agricultural and forestry topics as well as those specifically related to soils.

Student Interest in Maps

Special maps have been prepared for wide distribution and have been extensively used in high school, college, and university classrooms. The Soil Zone Map of Alberta was, for many years, a popular map of the seven major soil zones of the province. Taking its place now is a more up-to-date map of soils, the *Soil Group Map of Alberta*, which was first published in the *Alberta Atlas* in 1969, and is also available as an 8½ x 11 inch map from the Faculty of Extension.

Just last year, a new 19 x 25 inch map of *Generalized Land Capability for Dryland Agriculture in Alberta* was published. The initial separations for the map were based on climatic parameters, followed by consideration of soils and landscape features such as: kind of soil, texture, drainage, steepness of slopes, and stoniness.

The *Soils of Alberta Display Kit* is of special interest to junior high school students. This package of display material was prepared to illustrate some basic soil types and their locations in Alberta. It includes a color soil zone map, a rainfall map, a set of color soil profiles, photographs, twelve vials of various soil samples, and the publication *Soils and Fertilizers for Gardens and Lawns*.

A Soils Film

A forty-minute color 16 mm movie on *The Soils of Alberta* has been produced for use with senior high school, college, and other adult audiences. It provides an introduction to the different types of soils and their location in Alberta. Features in the movies are: Northern and Western Forest Lands, Alberta Parklands, Grasslands of Alberta, and Solonchic Soils. The film is available on a rental basis from the Educational Media Division of the Faculty of Extension.

Technical Bulletins

Because nearly twelve million acres or about thirty percent of the arable land in Alberta occurs on Solonchic Soils, it is appropriate that the Institute has compiled an extension bulletin on *Solonchic Soils Technology and Management*. Published in 1973, the bulletin is a joint contribution of the University of Alberta and Agriculture Canada. It presents a complete summary of all technical information accumulated during a half century of study and use of these soils in Alberta and is of particular interest to extension and technical advisors.

A similar publication is *Gray Wooded Soils and Their Management*, which is in its seventh edition. The previous six editions were restricted to a presentation of results of the work by the University of Alberta Department of Soil Science. However, this current edition also includes the important work that has been done by Agriculture Canada Research Stations at Beaverlodge and Lacombe. This bulletin is of special interest because Gray Wooded soils were originally identified and described in Western Canada. Moreover, while these soils constitute only about fifteen percent of the acreage now cultivated in Alberta, it is probable that within a few decades about forty percent of the land cultivated will be of the Gray Wooded type.

Soil Survey Reports

The inter-agency cooperation that is reflected today through the Alberta Institute of Pedology was apparent as early as the 1920s when Soil Survey work began in Alberta. This early work was financed jointly by the University of Alberta and the Alberta Department of Agriculture, while the Federal Government provided the base maps and drafted the soil maps. The Soil Survey program provides an inventory of soil resources with interpretations of soil properties for use limitations and suitability. Over the years, thirty Soil Survey Reports have been published, of which twenty-three are current in print and available for

purchase from the University of Alberta Bookstore. Recently, an *Alberta Index to Soil Surveys* has been published as a brochure to assist people in identifying and selecting appropriate reports.

A complete listing of University of Alberta agricultural extension publications, including those of the Institute of Pedology, is available from the Coordinator of Agricultural Extension, Faculty of Extension, University of Alberta, Edmonton, Alberta, T6G 2G4.

The Alberta Institute of Agrologists

By D.K. McBeath

The Alberta Institute of Agrologists is an organization of professionally trained people in agriculture. The Institute was founded in 1947 following passage of the Agrologists Act by the Alberta Legislature. The major aims of the Institute are to maintain and promote high standards of service in the practice of agrology, to protect the public from incompetent practitioners, to assist in improving the agricultural industry, and to advise governments concerning agricultural education, research, and production.

These aims are fulfilled by programs of continuing education and disciplinary actions among members, by involvement in agricultural education at both technical and professional levels, and through studies, committee assignments, refresher courses, reports, and presentations to government.

Alberta's soil scientists have taken a very active part in the affairs of the Institute both as appointed officers and as elected officials. The following soil scientists have at various times been appointed to the offices of Secretary, Treasurer, or Registrar: W.E. Bowser, Dr. J.A. Toogood, T.W. Peters, J.D. Lindsay, J.A. Carson, and Dr. J.A. Robertson. Soil scientists who have served the Institute as elected Presidents are Dr. C.F. Bentley, K.K. Krogman, T.C. McBeath, Dr. D.K. McBeath, and Dr. J.A. Toogood.

The Alberta Institute of Agrologists, Institutes of Agrology in other Canadian provinces, and several scientific societies—among them the Canadian Society of Soil Science—constitute the Agricultural Institute of Canada. This organization attempts to fulfill, at the national level, the same aims as the Agrologist Institutes within the various provinces. To this end, studies are carried out and presentations are made to national government officials for the betterment of the Canadian agricultural industry.

Soil Survey in Alberta

Soil survey work was started in 1921 by Dr. F.A. Wyatt of the Soils Department at the University of Alberta. The initiating force was the serious problem of wind erosion in southern Alberta which was resulting in large-scale land abandonment.

These first surveys, based almost wholly on surface textures, had, by 1926, covered over seven million acres, using two Model-T Fords for transportation. Funding for this early work came jointly from the University of Alberta and the Provincial Department of Agriculture, with cartographic help from the Dominion Department of the Interior.

The late 1920s saw several changes. Literature from the USA and Europe, plus visits by noted soil scientists, such as Marbut and Glinka, sparked interest in the soil "profile" and subsequent soil surveys recognized additional soil features beyond surface texture. Also, in 1928 the recently established Research Council of Alberta made money available for exploratory soil surveys in the Peace River area of northern Alberta to assess its agricultural potential. Over the next three years some twenty million acres were covered by pack horse. At the same time, soil surveys were being conducted in the Lethbridge and Vauxhall areas to determine the suitability of these areas for irrigation.

The recession of the early 1930s halted soil-survey work until 1935 when the Dominion Government initiated programs under the Prairie Farm Rehabilitation Act (PFRA) to rehabilitate the drought-stricken prairies. As a result, W.E. Bowser, who had assisted with some of the earlier soil surveys, and W. Odynsky became the first full-time soil surveyors. While the PFRA paid their salaries and field expenses, the organization remained, as before, attached to the Soils Department at the University of Alberta.

The remaining portion of the prairie region was covered at a rate of about 2½ million acres per year in the period from 1936 to 1944. Soils were described by a three-number code which indicated soil zone, mode of deposition of parent material, and profile type. The resulting soil survey report included a soil map and an agriculture rating map for each map area.

A new phase for soil surveys was started in 1945. It began with the first meeting of the National Soil Survey Committee out of which came the concept of the soil series as the basic unit of classification. This period was marked by increased activity in soil surveys for irrigation, and the Alberta Research Council's re-entry into the soil survey field with the establishment of its Soils Division. Council work was mainly confined



Dr. F.A. Wyatt

to northern Alberta. In 1948, W. Odynsky left the Dominion soil survey to become head of the Research Council soil survey unit. From that time on the Federal and Provincial soil survey units collectively became known as the Alberta Soil Survey.

Soil survey techniques changed rapidly in the decade following 1945 with the introduction of air photos, and the replacement of pack-horses by all-terrain vehicles and helicopters. Reconnaissance soil surveys, covering some twenty million acres in the Peace River country, and ten million acres in the northern and western prairies, were completed by 1970. In addition, soil surveys covering all the major irrigation districts had been completed.

During this period, soil survey units of both the Research Council and Canada Department of Agriculture approached their present sizes, receiving some impetus from the Canada Land Inventory program of the 1960s. Close association with the Department of Soil Science continued, and the University of Alberta continued to house the Alberta Soil Survey. In addition, soil survey reports were printed at the University and were made available through the University's Department of Extension. These informal arrangements were formalized into the Alberta Institute of Pedology in 1968. In 1977, primarily because

of space limitation, the agonizing decision was made to move the majority of the Alberta Soil Survey staff to off-campus quarters.

In 1968, W.E. Bowser retired and T.W. Peters became head of the Agriculture Canada Soil Survey Unit, to be followed by W.W. Petapiece in 1974. J.D. Lindsay has directed the Soil Division of Alberta Research Council since the retirement of W. Odynsky in 1971.

With the near completion of reconnaissance soil surveys in the province, 1970 saw the introduction of some new aspects to soil survey. More emphasis was placed on various kinds of interpretations for alternative land uses. More intensive soil surveys were initiated to be used in a variety of detailed plans, particularly in planning for urban development.

Some of the major achievements of the Alberta Soil Survey over the past fifty years are:

1. A compilation of information regarding potentially arable areas of Alberta.
2. The development of a soil zone map for the province. This was started by Dr. Wyatt in 1920 and culminated with the printed version prepared by W. Odynsky in 1945.
3. Cooperative work with Veterans Land Act staff involving land purchase and settlement.
4. Assisting and overseeing the provincial land clearing project in the Peace River country of Alberta.
5. Cooperation with PFRA in development of standards for soil irrigability ratings for the prairies.
6. Continued assistance and cooperation with the Department of Municipal Affairs in standardization of rural assessment including direct involvement in the Assessment Manual.
7. A variety of work for several of the Regional Planning Commissions as an aid for detailed planning, particularly in the urban fringe.
8. Pioneering use of the helicopter for broad exploratory surveys in poorly accessible areas.
9. Cooperation with provincial and federal personnel in areas of soil management and amelioration. This has involved mainly Solonchic and Luvisolic soils and includes contributions to bulletins on the management of these soils.
10. Contribution to the development of criteria for soil-capability analysis for agriculture under the Canada Land Inventory. This included an agro-climatic map of the province and the assessment of capability for about 115 million acres of land in Alberta.
11. Characterization of the major Alberta soils and research into their genesis and classification. This project included five PhD programs and over twenty MSc degrees for graduate students in the Department of Soil Science.

12. In recent years there has been increased involvement with resource surveys for National and Provincial Parks development.

13. Members of the Alberta Soil Survey also have been involved in work outside the province, ranging from the neighboring territories in the north, to overseas assignments, to developing countries.

14. Members of the Alberta Soil Survey have been active in both national and provincial professional organizations and technical committees including the Canada Soil Survey Committee, the National Committee on Forest Lands, the Agricultural Institute of Canada, the Canadian Society of Soil Science, the Alberta Institute of Agrologists (W.E. Bowser was a principal organizer), the Alberta Soils Advisory Committee, and many standing committees in the province.

Presently, Alberta Soil Survey has a complement of twenty-two (Alberta Research Council—twelve, Agriculture Canada—ten), which includes thirteen professional, seven technical, and two stenographic-clerk positions. This is augmented from time to time by contract and other term positions.

The present soil survey program has three main emphases:

1. Reconnaissance soil surveys (scale about 1:125,000). These include re-surveys of areas with only preliminary information in both the prairies of the southern plains and the forest lands of the western uplands and also includes soil surveys of our mountain parks.

2. Semi-detailed soil surveys (scale about 1:50,000). These are intended for general land-use planning for proposed irrigation areas and parks planning.

3. Details of soil surveys (scale 1:5,000 to 1:20,000). These are mainly confined to areas of intensive land use around cities and towns, and in parks throughout the province.

Interpretations are an integral part of the soil survey program. Interpretations from smaller-scale surveys are directed mainly toward agriculture and forestry uses. However, increased details of soil surveys result in a corresponding increase in the kinds and numbers of interpretations that can be made. From the determination of many engineering properties of soil, predictions can be made regarding the soil's suitability for topsoil, septic tank fields, landfill, or road construction material.

Besides its soil survey program, the Alberta Soil Survey is active in strip mine reclamation, in interpretations for recreational use of land, in soil amelioration, and in land evaluation for agricultural production, particularly the relation of crop yield to various soil types and climates.

This brief history of the Alberta Soil Survey shows its growth from a meagre beginning to its present size. Through the years of growth, soil survey knowledge has greatly increased and techniques have been improved and refined, particularly in interpretations. More requests of increasing variety are being made for the data that are being and have been assembled by the Alberta Soil Survey. The future seems to offer even greater diversification, with particular emphasis on applied aspects.

Provincial Government Soils Branch

One of the major roles of the Department of Agriculture over the years has been to provide effective communication of new information to farm producers and to relay their problems back to research agencies. Wind and water erosion and weed infestation were some of the first problem areas related to soils in which the Department took an active part in order to minimize the ravages to soil caused by these destructive forces. Control measures and practical management practices such as strip farming, stubble mulching, and forage rotation were demonstrated on farms and at field days.

The Soil Drifting Control Act was passed in 1935 and special district programs were developed to highlight the need to conserve the soil. This was followed by the introduction of programs dealing with fertilizers and herbicides in order to overcome recognized plant nutrient deficiencies and to control the increasing weed problem.

A special section of the Field Crops Branch, called Soil Conservation and Weed Control, was first formed in 1947 with one permanent employee to deal with soil concerns on a provincial basis. Under this section, projects for soil reclamation and forage seed distribution were initiated and a "Save the Soil Campaign" was started. Increased emphasis on fertilizer use resulted in greater demand for recommendations, and in 1949 the Alberta Fertilizer Advisory Committee was formed to review annually results from fertilizer experiments and to coordinate fertilizers recommendations. This Committee was composed of representatives from federal and provincial departments of agriculture, University, and agribusiness and served as an effective link between research and the farm producer through regular publication of the *Alberta Fertilizer Guide*.

In 1955, the Alberta Government established the Agricultural Soil and Feed Testing Laboratory (ASFTL) as a service for Alberta farmers, greenhouse operators, and

gardeners. Compilations of data by the ASFTL over the years have resulted in identification of several soil problems such as occurrence of areas of potassium-deficient soils and the dimension of problems in soil acidity.

Re-organization of Alberta Agriculture in 1965 resulted in the formation of a separate Soils Branch with the responsibility for providing an effective program of education, demonstration, regulation, and soil testing services for the efficient use and protection of Alberta soil resources. The Soils Branch presently consists of seven professional agrologists with master's-level training in different areas of soil science. Branch objectives are concerned primarily with extension services for the farming public in matters dealing with soil management, fertilizer, and soil amendment use. The professional staff fills this extension role by providing the farming sector with current research information and laboratory services to assist in the solution of soil-related crop production problems such as erosion, fertility, salinity, acidity, and poor physical condition of soils. Effective liaison is maintained with other government agencies, research institutions, agribusiness, and universities. Soils Branch staff also are involved in applied research projects on a cooperative basis with other institutions. An example of this research activity is the recently completed cooperative study with the University of Alberta, Agriculture Canada research stations, and agribusiness in which extensive field-plot studies were carried out for several years across Alberta to improve fertilizer recommendations for major cereal and oilseed crops.

Extension services of the Soils Branch include preparation of press releases and fact sheets as well as participation in radio and television programs, short courses, and farm meetings. The laboratory analytical services of the Agricultural Soil and Feed Testing Laboratory provide an effective mechanism for diagnosing soil-related cropping problems and providing recommendations to local extension staff for corrective action.

In early 1977, and again in 1978, the Soils Branch presented the Alberta Soils Home Study Course in two regions of the province. The Course has been well accepted by the farming public as a vehicle for obtaining extension information on many aspects of soils. The 1600 students had the opportunity to attend regional seminars and district study sessions. The success of the home study approach for dissemination of extension information will undoubtedly influence the direction of future extension programs of the Soils Branch.

With the expanded soils extension and

research programs in Alberta, an increased need has developed for communication between workers involved and interested in current concerns in soil science. The Soils Branch has played an active role in organizing and serving on committees and organizations designed to facilitate and improve communication between soil workers.

The Alberta Soils Advisory Committee was named in 1964 to replace the Alberta Fertilizer Advisory Committee and to assume an expanded role covering all aspects of soils related to land use. Several subcommittees now report to this Committee on matters concerning soil salinity and drainage, Solonetzic soil reclamation, soil testing, and soil quality criteria. The duties of these Committees are: to review and summarize soils research, to provide soil information for extension agencies, and to formulate recommendations for action on current concerns in soil science for the Ministry of Agriculture and other agencies. Another valuable communication role is provided by the Alberta Soil Science Workshop, which annually sponsors a seminar to highlight current research and technological information regarding specific soil science topics of interest and concern to Albertans. Recent workshop programs have featured nitrogen in Western Canada (1976) and soil conservation and reclamation (1977).

Soil Science and the Alberta Land Conservation and Reclamation Council

B. H.W. Thiessen, Environment Alberta
The Council, which was first established in 1963 to regulate the mineral extraction industry and ensure satisfactory land reclamation upon abandonment, was transferred from the Alberta Department of Mines and Minerals to the Alberta Department of Environment in 1972. At that time, its first professional agrologist, H.W. Thiessen, was appointed Chairman. Since then, four professional agrologists, of whom three are soil scientists, have been employed as Council staff.

The Council's responsibility has grown from monitoring oil, gas, and coal reclamation efforts to granting exploration, development, and reclamation approvals on coal, oil sands, pipeline, and lake shoreline development applications, levying of security deposits, and certifying reclamation works on a wide variety of surface-disturbing activities.

The Council has also engendered a reclamation philosophy that has been accepted

as official Alberta Government policy requiring the reclamation of land to a state equal to or better than it was prior to disturbance. In addition, it has developed reclamation guidelines applicable to most forms of surface disturbance throughout the province.

It also administers an annual five million dollar Heritage Savings Trust Fund for the reclamation of derelict lands disturbed prior to recent stringent requirements and for the furthering of reclamation research.

Through its efforts, the Council is furthering the application of scientific principles and practices to balance land-use requirements with land conservation and environmental management.

This Land of Alberta

Participants in the 11th ISSS Congress will receive a copy of the draft issue of a publication entitled *This Land of Alberta*.

The proportion of urban residents in the Alberta (and Canadian) population has increased rapidly in recent decades and Alberta educators are desirous of including material in the secondary schools that will assist in creating an understanding and appreciation of the importance of land to all citizens. *This Land of Alberta* has been prepared by Alberta Agriculture with a two-fold objective. The publication will provide Congress visitors with general information about the land resources of the province and of the importance of the land base in relation to agriculture, forestry, recreation, and water resources. *This Land of Alberta* will also be evaluated as to its possible suitability as either a background resource or a classroom document for a proposed section in the secondary school curriculum which may be titled "Land and Life."

It is hoped Congress participants will find *This Land of Alberta* an informative booklet. Comments and suggestions about it are invited and may be sent to the Congress office at: Box 78, Sub 11, University of Alberta, Edmonton, Alberta T6G 2E0.

Solonetzic Soil Research in Canada

*By R.R. Cairns
Agriculture Canada, Vegreville*

There are estimated to be between eight to twelve million hectares of Solonetzic soils in Western Canada. In 1956, a Research Unit was established at Vegreville, Alberta and a

program was initiated to attempt a serious improvement in the productivity of these problem soils.

Solonetzic soils have very unfavorable chemical and physical characteristics mainly due to the presence of sodium sulphate (a soluble salt). The adverse effects are primarily due to the sodium ion when it is attached to soil particles in any consequential amount. The sodium causes formation of a dense, hard, pan-like layer in the subsoil (Bnt) which usually has a high clay content and seriously inhibits water movement and root penetration. Improved productivity of these soils depends on the improvement of their chemical and physical properties, especially those of the hard pan layer.

The first step in initiating the research program was to conduct an extensive review of the literature and establish international contacts. Ideas were borrowed liberally and show up in the work. Since only one Canadian scientist was assigned to deal with a vast area of extremely difficult and varied soils, it was necessary to secure voluntary cooperation with university, provincial, private, and other federal scientists. Much of the work has been cooperative.

Nutritional Status of Solonetzic Soils

Natural productivity of these soils is extremely low. Extensive experiments showed that these soils were seriously lacking in nitrogen as a result of sparse plant growth throughout the period of soil development. In field experiments, the dry matter yield of brome grass was tripled with nitrogen fertilizers. This increased growth should eventually lead to amelioration of the soil, but the nitrogen had an undesirable side effect: over time, generous applications of nitrogenous fertilizers further decreased the already acidic surface soil layers. For example, ammonium sulfate at 530 kg/ha over a five-year period decreased the pH of one soil, Duagh Silt Loam, from 5.3 to a very undesirable level of 4.0 and removed from the soil particles a significant portion of the already low amount of exchangeable calcium.

Deep Plowing. Experiments conducted in the greenhouse showed that mixing surface, subsurface, and deep subsurface soil layers (the Ap, Bnt, and Csk horizons), of a particular Solonetzic soil increased the growth of wheat about ten-fold over that obtained from the surface or topsoil layer (the Ap horizon). Deep plowing experiments were commenced in the field to test those greenhouse findings on several Solonetzic soil types and crop responses were very favorable and general. Eleven years after a plot had been deep plowed, the surface soil still had a more desirable pH and the subsoil (Bnt) a more



Dr. R.R. Cairns

favorable sodium content than the comparable unplowed area. In fact, the deep-plowed Duagh Silt Loam appeared to be turning into a friable soil of good quality.

Deep plowing has generally resulted in: (1) an improvement in reaction (pH); (2) a movement downward of the objectionable sodium; (3) an improvement in the calcium-sodium ratio; (4) increased root penetration; (5) improved infiltration and penetration of water; and (6) an increase in the nodulation of legume roots. However, deep plowing of some soils did not overcome their serious structural problems. That was because they lacked sufficient calcium salts in the deep subsoil (Csk) to displace most of the objectionable exchangeable sodium attached to the soil particles in the Solonetzic soil layer (the Bnt horizon).

Other methods of soil horizon mixing such as chiselling, trenching, and so forth were found to be either not as effective as deep plowing or more costly.

Gypsum as an Amendment. Gypsum alone was not an effective amendment because of its low solubility and the increased acidity it caused. The gypsum did not penetrate to the Bnt horizon where it was required. To work it into the Bnt horizon was costlier than to make use of the native gypsum located in the deep subsoil through deep plowing.

In the laboratory, ammonium nitrate fertilizer increased the solubility of gypsum. In the field, combined applications of ammonium nitrate (449 kg/ha) and gypsum (4.48 tonnes/ha) were added to a brome grass sod for four years. The soil was a Brown Solodized Solonetzic with high exchangeable sodium percentages in the Ap and Bnt horizons, respectively. The significant effects of the combined applications were to reduce exchangeable

sodium, increase water infiltration and depth of calcium penetration, and provide a small yield increase over that of ammonium nitrate alone. These studies indicated a combined effect, whereby the solubility and penetration of gypsum are enhanced by ammonium nitrate. However, these results were not economically practical at the rates used in this initial study and further experiments are required.

Irrigation In 1947, a series of irrigation studies was initiated incorporating deep plowing, amendments, fertilizers, and manure. Only two of the three major studies will be mentioned briefly here. From a long-term standpoint, the success of irrigation is more dependent on eventual soil conditions than on immediate yield gains.

Alfalfa seeded in 1974 after the soil had been prepared the same spring, established and nodulated well, especially on the deep-plowed areas. During the three year, 1974 to 1976 inclusive, the average annual alfalfa dry matter yields were: irrigated check, 5429; irrigated and fertilized, 6446; deep plowed, 7540; and deep plowed and fertilized, 8352 kg/ha.

In the spring of 1975, brome grass was drilled into native sod and a series of treatments, both amendments and fertilizers selected on the basis of results previously obtained on dryland and in the greenhouse, were applied. These treatments included several unusual chemical applications such as ammonium polysulfide, ammonium thiosulfite, lime-sulfur solution, and gypsum, with and without a blanket application of ammonium nitrate. Under irrigation in southern Alberta, ammonium nitrate alone gave dramatic dry-matter yield increases from an unfertilized yield of about 2000 kg/ha to over 8000 kg/ha for the fertilized area. No other treatment except ammonium bisulfite approached ammonium nitrate in effectiveness.

Solonetzic soil research in Alberta has resulted in important knowledge now being used by many of our farmers. However, additional knowledge is needed if the productivity of the vast areas of these problem soils is to be increased.

The Department of Soil Science at the University of Alberta

By S. Pawluk, Chairman,
Department of Soil Science

The discipline of soil science is presented at the University of Alberta as a Department within the Faculty of Agriculture and Forestry. The Soil Science Department is

also one of the three groups constituting the Alberta Institute of Pedology.

In J.D. Newton's article on page 5 of this *Folio*, he describes the origins of our Department, the first Department of Soil Science to be established in Canada. The Department of Soils was first listed in the 1918-19 University Calendar, the Department being organized in 1919 under the direction of Dr. F.A. Wyatt. Under his guidance, research was directed toward problems of agricultural soil management in dry farming, irrigated farming, and drainage. A soil test program became part of the Department's responsibility until 1956 when a newly organized Provincial Agricultural Soil and Feed Testing Laboratory took over this function. Agricultural concerns prevailed in the Department's research planning until the introduction of the Forestry Program to the Faculty in 1970. Today, research responsibility in the Department is greatly expanded and very diverse. Staff members are committed to research related to forest management and environmental preservation concerns which, together with those related to food production, are foremost among the problems facing today's society.

The evolution of the Alberta Institute of Pedology is an outcome of the close relationship that existed between the Soil Science Department and the Alberta Soil Survey from the time of its inception. The Soil Survey was initiated by Dr. Wyatt in 1921 to help deal with drought and wind erosion problems of southern Alberta. The Soil Science Department staff played a major role during the first decade of the Soil Survey's existence; however, this function was later assumed jointly by the Canada Department of Agriculture and the Alberta Research Council. A close but informal relationship existed between the two Soil Survey units and the Soil Science Department until 1968. At that time, the Alberta Institute of Pedology was organized by agreement between the University, the Research Council of Alberta, and the Research Branch of the Canada Department of Agriculture. The function of the Institute is to coordinate the planning and execution of soil survey in Alberta; the interpretation of basic data on Alberta soils for use by all disciplines wishing to employ or apply soil survey information; the research in all aspects of soil science; the compilation and publication of soil information; and the clearing of requests for assistance and/or cooperation from other institutions or agencies concerned with pedological data.

Dr. Newton's article refers to contributions made by the Department up to 1960. Since then its contributions have tended to widen in scope, touching the interests of more

and more people in our community. First and foremost, University of Alberta graduates from programs in Soil Science are assisting in the proper husbandry of soil resources not only in Canada but also abroad. Under the auspices of organizations such as CIDA, IDRC, UNESCO, and CUSO, many of our graduates are assisting our friends of the developing nations to increase their domestic food production through improved management, planning, and conservation of their soil resources. Through extension services at home they are performing a similar function. Soil scientists, since 1960, also have found themselves involved in much more than agricultural production. Recent years have seen them involved in land-use problems, forestry, engineering aspects, land reclamation, and remote sensing studies—to name just a few areas of interest.

As the Western Canadian economy shifts to a closer balance between an agrarian and an industrial society, the need for teaching and research in the area of soil science will be even more apparent than it is today. Soil is a limited renewable resource and competition for its use for non-renewable objectives is increasing; at the same time greater pressure is being exerted for diversification in its use as a renewable resource. Detailed land-use planning, reclamation research, and soil management with resource conservation as a principal theme is rapidly emerging and is likely to occupy the forefront of our teaching and research in the foreseeable future.

Homesteading and Land Use in Alberta

By C.D. Sawyer, P.Ag. and Colleagues

In Western Canada, "homesteading" refers to the programs whereby early settlers were able to acquire a "homestead" of 160 acres ($\frac{1}{4}$ of a section or square mile) to start farming. While basic soil knowledge and other scientific information for the guidance of land settlement in Alberta has been available only since about 1940, the early settlers chose their lands on the basis of proximity to railways, supply centres, water supply, and ease of clearing. Soil quality was a secondary consideration. Results were often catastrophic and many farmers or even whole communities were forced to abandon farms and move. Today, soil survey and other scientific information is used by multi-disciplinary teams of land-use planners to allocate lands and plan development, in the hope that farms established will be viable units.

The original 1971 federal land policy for the Prairie Provinces granted each settler the



160-acre homestead plus an additional pre-empted quarter section for an application fee of \$10. Homesteaders were required to reside on their land for at least six months and bring under cultivation at least fifteen acres per year for each of the first five years. In 1908, two sections (of one square mile each) out of every thirty-six sections were designated to support schools.

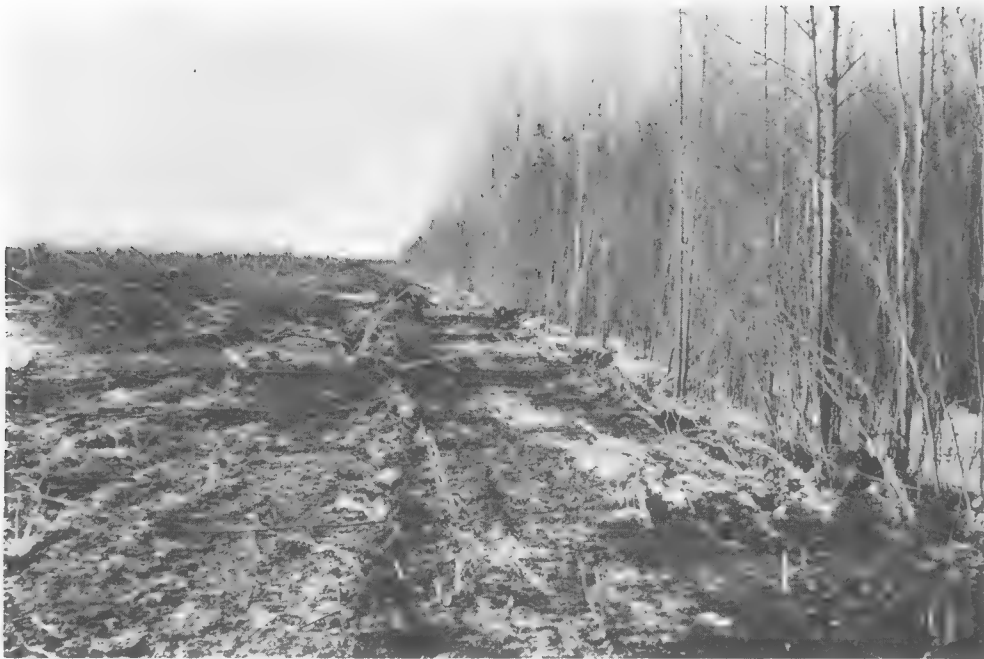
Great hardships and damage to land resulted from the development of an area in the arid region of southeastern Alberta and southwestern Saskatchewan known as the Palliser Triangle. After investigation, Captain Palliser during the period 1857 to 1860 recommended that the area not be settled for farming because of the aridity then evident. However, early settlers, in the period 1900 to 1915 were encouraged by a decade of good crops, and a great influx of farmers occupied most of the region. By 1921, due to drought and soil erosion, there was great distress among farmers in the Triangle. Cultivation of arid soils in a region of very high winds had created a dust bowl. Soil surveys were started to identify causes and the most seriously affected soils. During the particularly dry period of the 1930s, soil erosion and low prices caused disastrous conditions in much of the Palliser Triangle. By 1938, the Alberta Government was obliged to take over the entire administration of the most severely affected areas under a "Special Area" concept. Small farms that were not viable were consolidated into ranches. Abandoned lands were later re-grassed and their use

changed from cereal production to grazing for livestock.

The foregoing experience caused an important change in land settlement policies in Alberta. It indicated the necessity to appraise and evaluate the soils and use other scientific information when considering areas for settlement. Consequently, in 1939, the Alberta Department of Lands and Forests employed two agricultural graduates with soils training and experience to guide settlement by "homesteaders." Working with other pedologists, the two agrologists developed criteria to evaluate crown (public) lands. Homesteading was restricted to lands judged to be suitable for farming on the basis of their soils and climate. Additional agrologists were employed after World War II to assist in selecting farm lands to be available for returning war veterans. Soil scientists were consulted and some 150,000 acres of land were set aside for a government-sponsored land development project in Alberta's Peace River country. Today, this area is quite productive, emphasizing the production of forages, including legumes and grazing.

After 1939 all Alberta homestead applications resulted in inspection of the land by agrologists to determine if at least fifty percent of the individual parcels would be suitable for arable agriculture.

The last great land rush occurred in Alberta on 11 June 1962. On that date "school lands" suitable for arable agriculture were released for homesteading if they were located in established farming areas. Those



lands were taken up immediately and are now integrated into successful farming units.

During the 1960s, agrologists recognized the importance of controlled land use on stream banks and river breaks. Working with government lawyers, provincial agrologists arranged the implementation of a policy whereby creeks and adjacent banks on public lands being alienated were protected by a "Watercourse Agreement." This agreement prohibits tree-cutting and soil disturbances in and adjacent to designated watercourses. This prohibition applies not only while land is publicly owned but also after private title is issued. However, agrologists recognized the need for even more control over the uses of steep river break lands. Consequently, a policy not to sell such lands was implemented. Strict use controls are exercised, not only for erosion and watershed protection, but also to ensure appropriate and controlled grazing by livestock and wildlife as well as for recreation and forestry uses. These new policies, however, apply only in fringe areas of new settlements where there are publicly owned lands. In older and more settled parts of the province where virtually all lands are privately held, owners of forested and other sensitive areas of steep or watercourse lands have been encouraged to sell their holdings to the government so that appropriate protective measures may be applied.

Today, Alberta still has much publicly owned land marginally suitable for arable agriculture. However, even more stringent inspections and evaluations to determine suitability for farming are made before such

lands are released for settlement. Multi-disciplinary planning teams, including biologists, foresters, recreationists, and agrologists survey and review proposed land settlement projects and jointly make decisions on the use allocation of lands. Applicants are screened by agrologists and local agricultural development committees, and lands are awarded only to individuals judged to have a high probability of success.

Homesteading and pioneering have been glorified in Western Canadian history. In reality, the success of western settlement has also been accompanied by some unfortunate failures. Most failures resulted from settlement of lands not suited to arable agriculture. That was because of a lack of knowledge about the soils concerned. Today, modern technology and soil information are used to ensure a high probability of success of newly settled areas.

Lacombe Research Station

By D.R. Walker, Lacombe

The Lacombe Research Station, 120 km south of Edmonton, was established in 1907 to serve the research needs of agriculture in the south-central portion of Alberta. The area contains Brown, Dark Brown, Black, and Dark Gray soils of the Chernozemic order, Gray Luvisols (formerly referred to as Gray Wooded) and some rather extensive areas of Organic soils.

Studies of adaptation of crops, cropping

sequences, and cultural practices were of prime importance on the newly cultivated fertile Chernozemic soils. With the later settlement and development of the Gray Luvisol soils came the need for soil fertility studies. These soils, low in organic matter, did not support the continued production of cereal crops, unlike the Chernozemic soils. The demonstration of the beneficial effect of legumes, fertilized with sulphur where deficient, played a major role in establishing a viable agriculture on these soils. However, the Gray Luvisols presented other unique problems that required more intensive investigation, and in 1952 a soil scientist, D.R. Walker, was appointed to do research on these soils.

Depletion of the natural fertility of the Chernozemic soils with continued cropping, and the realization that yields were not at levels commensurate with climatic conditions, indicated that increased soil research was desirable. Expansion of the soil research section occurred gradually. D.A. Dew joined the staff in 1954 to study tillage and cultural practices that would maximize growth and at the same time prevent excessive soil erosion. In 1963, D.K. McBeath joined the staff as plant nutritionist. From 1968 to 1971, S.U. Kahn specialized in organic matter investigations.

Initial studies by those soil researchers identified soil problems of the area and determined corrective procedures needed. Later studies have concentrated on diagnostic techniques for identifying deficiencies of the various plant nutrients and the development of yield-response curves for the economic analyses of fertilizer use on various crops.

A large portion of the research work by soil scientists at the Lacombe Station is done in cooperation with staff members of the Faculty of Agriculture, University of Alberta, various branches of the Alberta Department of Agriculture, other federal research stations, and the research and development departments of fertilizer companies. In addition, much of the field work is done with the ready cooperation of farmers on private farms throughout the area served by the Station.

Research has established the importance of sulphur fertilization for many of the Dark Gray and Gray Luvisol soils. This has led to development of a soil test for predicting sulphur deficiency on such soils. More recently, potassium deficiency has been confirmed on some six to seven million hectares of Alberta soils and field correlation studies have established good relationships between extractable soil potassium and probable potassium deficiency.

The current soil research at the Lacombe Research Station is focussed on: reducing

energy and cost inputs through minimum or no tillage; reduction of losses from applied nitrogen fertilizers through denitrification or leaching; fertilizer-herbicide interactions; and determination of the practicality of infrequent, large applications of fertilizers.

Soils Activity Within Alberta Agriculture's Irrigation Division

By D.A. Roll, R.C. McKenzie, and B. Patterson

Most of the soils activity in the Irrigation Division of Alberta Agriculture originates at the farm level with the Irrigation Specialists in the Farm Irrigation Services Branch offices located at Brooks, Medicine Hat, Taber, Vauxhall, Calgary, Strathmore, and Lethbridge. Each of these Specialists, trained in soils and engineering or agronomy, is responsible for a specific territory in the irrigated areas; and it is to these people that the farmer usually presents his case when confronted with a soil or drainage problem.

If the problem is within the Irrigation Specialist's immediate jurisdiction he, along with his technical staff, can assist the farmer directly. Providing land-levelling designs for border dyke irrigation and advising clients on the feasibility of a particular system are two examples of this type of assistance. Both require an understanding of the field-soil characteristics to ensure that the design of the system allows the correct amount of water to be applied and at a rate compatible to the infiltration rate of the soil.

Close liaison is maintained with the Applied Research Section of this Branch so that any new information applicable to irrigation-cultural practices is made available to the farming public. Research is conducted on soils and irrigation systems to aid the Irrigation Specialists in their extension activities with farmers. Surface and sprinkler irrigation systems are evaluated to determine their effects on soil moisture distribution, uniformity of application, and salt movement. Experiments have been conducted to determine moisture use for barley, rapeseed, mustard, faba beans, potatoes, and carrots. Field plots have been established recently in the Peace River area to measure the suitability of irrigation in northern Alberta.

In 1977, a critical water shortage was experienced by most irrigation districts in southern Alberta as a result of below-average snowfall in the Rocky Mountains and low precipitation during the growing season. This has encouraged studies into ways of increasing the efficiency of irrigation water use.

Frequently, it is necessary to refer problems



The Brooks aqueduct was constructed in 1913 to supply irrigation water to farms east of Brooks.



A centre pivot irrigation system in southern Alberta.

of a specialized nature to Specialists in other Branches of the Division. For example, a client wishing to install a center pivot on land that has not been irrigated previously may be interested in knowing if the soils are suitable for irrigation purposes. At this point, the Soils Section of the Technical Resources Branch may be called upon to investigate the area and provide a detailed soil classification. This gives the farmer a basic inventory of the soil characteristics and a recommendation concerning irrigation suitability. This Section is also investigating the influence of deep tillage on irrigated Solonchic soils. To facilitate the work of the Irrigation Division, the Soils Section operates a soils laboratory in the Agriculture Center at Lethbridge.

When farmers or irrigation districts

encounter salinity problems, reclamation assistance is provided by the Drainage Section of the Technical Resources Branch. Drainage Specialists will investigate the nature of the soils and ground water and then prepare designs and cost estimates for suitable drainage systems. The Section also takes part in long-range planning to evaluate methods of reclaiming salt-affected lands and prevention of future salinity problems. Research programs also are carried out to evaluate the effectiveness of shallow-subsurface plastic-drain tubing for the reclamation of saline and water-logged soils. Irrigation return-flow studies are carried out by the Drainage Section in cooperation with Agriculture Canada and Environment Canada.

Other research in the Irrigation Division involves remote sensing of both drainage projects and soil and crop moisture conditions in irrigated areas. Data obtained can be used to evaluate the effectiveness of this technique for recognizing seepage areas and for determining crop irrigation needs. This activity involves cooperation with the Canadian Center for Remote Sensing in Ottawa and use of imagery from several United States satellites. Low level photography also will be carried out with commercial aircraft.

Intensive irrigated agriculture demands much from the soil. It also creates a multitude of complex soil problems that can be solved only by vigilance in recognizing them and by using the latest technology and expertise in offering solutions. The variety of ongoing activities in the Irrigation Division should assist in making our irrigated soils more productive.

Irrigated Soils of Alberta

By the Irrigation Division staff

Irrigation farming in southern Alberta is practiced in the semi-arid, short-grass prairies, south of latitude 52° along the Bow, Old Man, Waterton, Belly, and St. Mary Rivers. These rivers are the major sources of water. Low rainfall in the area of 100 to 300 mm per growing season, and high evapotranspiration caused by the hot, windy weather during the growing season create the need for additional water for economic production of most field crops.

A Brief History

The Western Prairies were colonized mainly in the late 1800s. In 1857, John Palliser from England investigated the agricultural potential of the prairies. After visiting the area in a drought cycle, he reported a large, roughly triangular area to be unsuitable for any kind of cropping.

Early settlers from the United States, disregarding Palliser's recommendation, initiated some irrigation development in the Palliser Triangle by diverting small streams to adjoining lands and by constructing crude dams of rock and brush. Soon after, group efforts commenced by building small canals near Calgary in 1877, near the Belly River in 1882, and around Cardston in 1889.

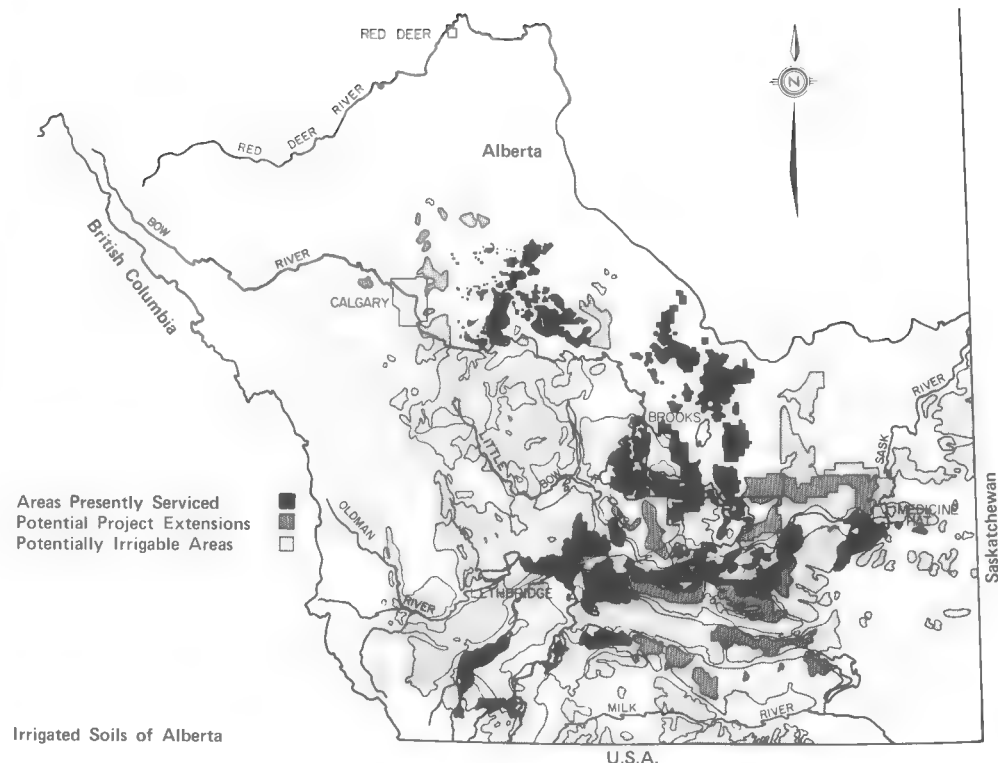
The Canadian Pacific Railway and the Canada Land and Irrigation Company separately initiated large-scale irrigation systems in the 1800s, and developed extensive areas for irrigation near Lethbridge.

The Alberta Government enacted the Irrigation Districts Act in 1915, setting the stage for the farmers to organize into Irrigation Districts, which is still the situation today. The accompanying map shows presently irrigated areas and potentially irrigable land. Water supply would be critical if all areas were developed.

Organization and Administration

Irrigation farmers are organized in thirteen Districts. Each District is administered by a board, a municipal body of elected farmer members, and an appointed secretary-manager. Farmers wishing to irrigate must purchase an irrigation right from the Irrigation District and pay an annual per-acre service charge for operation and maintenance of the District's system. Farmers not part of a District may obtain water rights from the Alberta Department of Environment for water diversion from sources other than a District's canal systems.

An Irrigation Council is appointed by the Minister to administer the Irrigation Act and advise on irrigation policies and related



matters. The Council consists of six farmer members, a representative of the Irrigation Division of the Alberta Department of Agriculture, a representative of the Alberta Department of Environment, and a secretary-manager.

At Lethbridge, the Irrigation Division of the Alberta Department of Agriculture provides services to irrigation districts and farmers through its three branches as follows:

1. *Project Planning Branch*—provides long- and short-range planning for irrigation development and service and for rehabilitation of irrigation works.
2. *Technical Resources Branch*—provides soil irrigability classification to ensure that only lands suitable for irrigation receive water, and directs the reclamation of lands damaged by seepage and salinity.
3. *Farm Irrigation Services Branch*—provides assistance to farmers for the effective and efficient use of land and water, and identifies irrigation problems and suggests solutions.

Irrigated Soils

Irrigated soils range from Brown soils in eastern Alberta to Black soils in the west part of southern Alberta. They are developed on glacial, parent material, mostly till.

Historically, irrigation was done by gravity below the canal with little regard for the irrigability of the soils. This practice resulted in salinization, water logging, and

general deterioration of some soils and focussed attention on the need for development of a soil classification system by which soils could best be selected for irrigation. In 1950, Bowser and Moss introduced the first Canadian rating system for irrigated soils. In 1964, a committee of the Canada Department of Agriculture produced a more detailed soil-rating system from which, in 1968, the Alberta Government prepared irrigation standards for soils, specific to Alberta, and set the minimum requirement with which any land must comply to be considered suitable for irrigation. The Alberta standards take into consideration the land topography, the soil profile characteristics, the parent material properties, the bedrock and subsurface water depth, and the soil drainability.

The Soils Section of the Technical Resources Branch upon request, examines, describes, and classifies the soil for its suitability for irrigation according to the Alberta standards. This section also provides information and recommendations about the soils and their management under irrigation.

The farmers' needs and demands for proper soil management have caused the Irrigation Division to undertake studies on defective soils, such as Solonchic soils, and saline profiles, as well as soil-water-plant relationship studies.

Area Statistics (1977) <i>approximate acres)</i>	<i>Hectares</i>	<i>Acres</i>
Irrigation Districts Total within district boundaries)	1,336,000	3,300,500
Assessed and presently served inside districts	392,000	969,400
Potential projects inside districts	143,000	353,600
Potential projects outside districts	304,000	750,000
Other areas with potentially irrigable soils	1,518,000	3,750,000

Soil Acidity Problem in Alberta is Revealed

It was eighteen years ago, in 1960, that Dr. Paul Hoyt applied lime to a Chernozemic soil in the Peace River region and the first crop response to lime in the Prairie Provinces was recorded. In the following year, lime was applied to several Chernozemic, Luvisolic, and Solonchic soils in the Peace that resulted in yield increases of brome grass alfalfa hay. Subsequently, liming trials were started by the Lacombe Research Station in Alberta and the Scott Experimental Farm in Saskatchewan.

In 1964, a full-scale investigation on soil acidity and liming was initiated at the Beaverlodge Research Station by the members of the newly formed Soil Section, Mr. Hennig Dr. Nyborg, and Dr. Hoyt. Cooperating with them were members of the Cereal Forage Sections. Out of this activity came recommendations for acid soil-tolerant crop species and varieties. Also, a rapid and reliable method for measuring toxic quantities of aluminum, the major cause of soil acidity damage to grain crops in the region, was introduced.

In 1970, the Beaverlodge Research Station cooperated with the University of Alberta in conducting twenty-eight field lime trials throughout Alberta and northeastern British Columbia. It was from these trials, together with nearly 90,000 soil samples submitted by farmers to the Alberta Soil Testing Laboratory, that an overall assessment was made of the acidity problem. Nearly twenty percent of the soils in Alberta were found to have $\text{pH} \leq 6$ where crop yields are affected by soil acidity.

Research today continues on a broad front by Canada Agriculture, the University of Alberta, and Alberta Agriculture. Recently, a scientific paper from the University of Alberta showed the extent of acidification of a Gray Luvisolic soil by fertilizers. There is a real danger that fertilizers will acidify soils with pH 6.1 to 6.5, which amount to about twenty-five percent of Alberta soils,

and cause them to fall below pH 6.0.

Research, however, can avert the problems that otherwise might arise. The farmers have already been helped by information on the tolerant crops and varieties for acid soils. On the other hand, liming on a wide scale has barely begun because of the wide dispersal of acid soils and the problem of coordinating supply and demand for a new commodity. Liming as a general practice, however, will surely come and the research already done will guide the most economic use of lime. Any new problems that may arise should be dealt with quickly because of the expertise on liming that has been developed by soil scientists in Alberta in recent years.

This stitch in time will surely save nine. For a problem that is estimated now to cost fifteen million dollars annually and is surely growing, that stitch in research came not one moment too soon.

Programs for the 11th ISSS Conference

All congress participants will receive two programs. One will be an eighty-page technical program that includes the time and place for all the approximately four hundred papers to be presented at the plenary sessions, symposia, and technical sessions. The second is a twenty-page non-technical program that provides details about tours, exhibits, films, social, and recreational activities, as well as services available to participants.

General Information

ISSS Exhibits

The exhibits in the Education Building Gymnasium will be open to the public from 19 to 23 June between the hours of 9:30 a.m. to 12 noon, 1:30 p.m. to 4:30 p.m., and from 7 p.m. to 9:30 p.m. On 24 and 25 June the hours will be from 2 p.m. to 5 p.m. Simultaneously, "museumobile" units will be open to all interested persons. One titled "Atlantic Canada" and another, "Canada North" can be found just west of the Education Building Gymnasium. Nine units from the Devonian Foundation, Calgary, will be found just east of the Jubilee Auditorium.

Should public interest warrant it, the exhibits in the Education Building will be continued on 26 and 27 June.

An extensive showing of films will be offered in the Education Building near the main exhibit area.

Medical Care for Visitors

While wishing all our guests good health and a pleasant stay, we want to remind visitors that medical care is available at the University Health Service. The Health Service building is located just west of the Emergency entrance to the University Hospital (refer to a campus map before setting out, as the building is a bit obscured by those around it). Open weekdays only from 8 a.m. to 5 p.m. Telephone: 432-2612.

Taxicabs

Alberta Co-op Taxi Ltd., 10544 110 Street, 425-8310.
Barrel Taxi, 15729 100A Avenue, 489-7777.
Central Cabs, 10808 129 Avenue, 478-2278.
City Cab Company Ltd., 10341 106 Street, 423-5151.
Gentry Limousine Service, 10132 92 Street, 429-3145.
Wagon Taxi, 7712B 73 Avenue, 465-1125.
Yellow Cab Ltd., 10572 101 Street, 426-3456.

Parking

The 11th ISSS Congress is to be headquartered at the Jubilee Auditorium and the parking area there is available to Congress participants as well as members of the public wishing to park there while visiting the exhibits.

Restaurants

The following list, hardly exhaustive, has been compiled from various sources, mostly personal acquaintance with the establishments. It is intended to offer the visitor a variety of dining environments. This list includes restaurants close to campus and downtown. Three financial categories are used:
Elegant, more than \$30 per couple;
Moderate, between \$15 and \$30 per couple;
Reasonable, less than \$15 per couple

Elegant

All restaurants are fully licensed unless otherwise indicated.

The Faculty Club

(Upstairs) 11435 Saskatchewan Drive. 432-4231. Varied menu, lobster often featured. Reservations necessary. Tie required after 6 p.m. Special permit card issued to conference members necessary.

The Library

11113 87 Avenue. 439-4981. Italian, French, and Western cuisine. Reservations recommended. Chargex accepted.

Piero's

8215 112 Street. 439-0048. Italian meat and pasta specialties and varied

dishes from the grill. Reservations recommended. All major cards accepted.

Jonathan's

10123 112 Street. 420-6818.

Varied international and French cuisine.

Reservations recommended. All major cards accepted.

Moderate

The Crêperie

10220 103 Street. 429-4706.

French crêpes and fondues. Reservations necessary. Chargex accepted.

The Keg & Cleaver

8020 105 Street. 433-2533.

Steak and seafood. Salad bar. No reservations. All major cards accepted.

Mother Tucker's Food Experience

10184 104 Street. 424-0351.

Roast beef and salad buffet. No reservations. Chargex accepted.

Reasonable

Reservations not accepted at the following restaurants.

Faculty Club

(Downstairs). 11435 Saskatchewan Drive. 432-4231.

Light meals and daily specials. Special permit issued to conference members necessary.

Incredible Edibles

HUB Mall. 432-7793.

Health food and gourmet specials every day. Informal setting. Not licensed.

The Rainbow Cafe

8534 109 Street. 433-6643.

Health food, daily specials. Not licensed.

The Gas Pump

11402 Jasper Avenue. 488-4841.

Varied menu. "San Francisco" atmosphere. Lounge.

International

Vienna Schnitzel Restaurant

11828 111 Avenue. 452-0810.

Austrian, German, and Swiss specialties.

\$4.00 to \$10.50. Reserve on weekends.

All major cards accepted.

The Hot Box

11639A Jasper Avenue. 482-2111.

Mediterranean food. Lunch menu ranges

from \$2.50 to \$3.95, dinner menu from

\$4.50 to \$6.95. Reservations recommended on weekends. Chargex accepted.

Mikado

10651 116 Street. 425-8096.

Japanese cuisine. \$3.25 to \$8.95.



Faculty Club privileges have been extended to visiting delegates of the 11th International Soil Sciences conference. Temporary membership cards may be obtained at the Auditorium. Visitors to the Club are

reminded that dinner reservations are required in the upstairs dining room where formal dining is offered Monday through Saturday from 6 p.m. to 10 p.m.

Reservations recommended on weekends. All major cards accepted.

Bruno's

8223 109 Street. 433-8161.

Continental dishes. \$5.00 to \$12.00.

Reservations. All major cards accepted.

Coffee Shops

Bistro Praha Gourmet Snack Bar

10168 100A Street. 424-1046.

Middle European light meals and specialty

coffees. Open from 11 a.m. to 1 a.m.

Monday to Saturday, and from 11 a.m. to midnight on Sunday.

Younger's Delicatessen

10045 102 Street. 428-8077.

New York style, fast service. Open from

8 a.m. to 6 p.m. Monday to Friday, and

from 10 a.m. to 4 p.m. on Saturdays.

Java Jive Coffee Shop

HUB Mall. 433-5573.

Specialty coffees, sweets, and pastries.

Open from 7:15 a.m. to 5 p.m. Monday to

Friday, and from 11 a.m. to 5 p.m. on

Saturday.

Lounges

Faculty Club

All lounges are closed on Sundays.

(Downstairs) 11435 Saskatchewan Drive. 432-4231.

Open from 11 a.m. to 1:30 a.m. Monday to Thursday and Saturdays. Closes at 12:30 p.m. on Fridays. Food services available during lunch and dinner hours. Special permit card issued to conference members required.

Smith and Bacchus

8625 112 Street. 432-1192.

Open from 11:30 a.m. to midnight Monday to Friday and from 5 p.m. to midnight on Saturdays. Food services during lunch and dinner hours.

Friday's

HUB Mall. 432-4516.

Open from 3 p.m. to 11:30 p.m. Food services from 7:30 a.m. to 7 p.m. Beer and wine only.

RATT (Room at the Top)

SUB, seventh floor. 432-2153.

Open from 3 p.m. to midnight Friday and Saturday, and from 3 p.m. to 11 p.m.

Monday to Thursday. Food services from 9 p.m. to 11 p.m. Monday to Saturday.

Parks and Quiet Walks Near the Campus

1. Hawrelak Park

Hawrelak Park, built on a curve of the North Saskatchewan River, features a man-made lake, grassy hillocks, excellent picnic facilities, and a superb children's play area.

The play area, at the east end of the park, has been imaginatively designed to allow children an almost unlimited variety of potential activities while restricting adult participation to watching.

Along the west side of the lake, toward the river, there are several attractive picnic spots, with views through tall conifers to the river.

The Hawrelak Park trail extends from the south end of Groat Bridge through groves of saskatoon bushes and old poplars around Mayfair Golf and Country Club to the park. This is a peaceful, pleasant walk which, because of the relative evenness of the trail, is much frequented by joggers.

The trail continues along the river bank south of the park, although riverbank slumping and erosion have made it a somewhat more difficult path which can be very slippery when it is wet. In places, the original trail has been washed out altogether, but there are several detours available.

The park trail joins Saskatchewan Drive near 76 Avenue, but hardy folk with plenty of time may wish to continue to Fort Edmonton Park (about 8 km from the beginning of the trail at Groat Bridge). The trail down Whitemud Hill and along the river offers some handsome vistas along the river valley, although there is some slumping and erosion damage and the trail may become slippery in wet weather. The University of Alberta was fortunate enough to have founders with a sense of grandeur, who obtained as a campus a handsome site above the south bank of the North Saskatchewan River. The result is that today the University sits in the midst of an oasis of parks and natural wooded river valley.

Whether you jog or hike or just stroll, alone or with a family, we invite you to explore some of the nearby parks along the riverbank. They are a certain antidote to the asphalt and concrete miseries and a source of refreshing quiet for adults, and great places for children to play.

Hawrelak Park is about 1.6 km west of the University, and may be reached by way of either 87 Avenue and Groat Road or Saskatchewan Drive and Emily Murphy Road.

2. Emily Murphy Park

Emily Murphy Park is smaller and less developed than the neighboring Hawrelak Park. It is a pleasant cool grassy area with



free standing poplars, beside the river, immediately northwest of the University campus. The park has a playground and several good picnic sites (the best are at the east end) with attractive views of the Victoria Golf Course and the Legislative Building across the river and the High Level Bridge.

This park may be reached by way of Emily Murphy Road or a steep little trail which begins just west of the University Forest Reserve, near the Junction of 116 Street with Saskatchewan Drive.

A trail extends east along the river bank from Emily Murphy Park. Although a very pretty trail, a slump in the bank and a deep gully make it difficult in wet weather; rocks and cobbles dumped at the bottom of the bank make an alternative route. Hawrelak Park Trail, discussed above, begins at the west end of Emily Murphy Park, beneath Groat bridge.

3. Kinsman Park (with fitness trail)

Kinsman Park is northeast of the campus, beneath the High Level Bridge. The Park, a north-facing slope of poplar and spruce, has a variety of terrains presenting a variety of potential recreational activities. There are picnic spots, a playground, and a pitch and putt area, but probably the park's most unique feature is its fitness trail.

A fitness trail is an outdoor exercise course scientifically designed to help people of

differing levels of fitness to maintain good physical condition. The idea of fitness trails began in Europe and quickly gained world popularity. They were introduced to Western Canada by the Edmonton Parks and Recreation Department.

The fitness trail at Kinsman Park is 2.4 km long, with 20 exercise stations spread over its length. At each station a metal plaque explains and illustrates the exercise to be performed and the number of repetitions required. The participant walks or jogs the length of the course, setting his or her own pace and stopping at each exercise station to do the appropriate bending, stretching, push-up, jumping, or chinning routines. The first few stations call for easy warm-up exercises which become progressively more difficult; the most difficult exercises may be by-passed until the participant becomes fit enough to complete the course. Completion of the fitness trail is roughly equivalent to a one-hour gymnastics class.

The handiest route to the fitness trail from the campus is a small trail which leads into the bush from Saskatchewan Drive, at approximately the northeast end of the Humanities Centre. Kinsman Park may also be reached by this route, by way of a broader trail leading under the High Level Bridge to the centre of the park from just west of 109 Street, or by way of 88 Avenue and

Walterdale Hill, past the south end of the High Level Bridge.

4. Queen Elizabeth Park

Higher above the river and more thickly treed than the previous three parks, Queen Elizabeth Park has several well-sheltered picnic tables and playground equipment for small children. A swimming pool, set among tall trees to the west of the park, is open only in summer. This is a pleasant, tranquil park, with handsome views of the city through tall spruce trees. Probably the best route from the University is by way of Saskatchewan Drive east of the High Level Bridge.

It should be mentioned that Saskatchewan Drive is a beautiful place for a stroll anywhere along its length, from just north of Belgravia Road to its eastern extremity above Queen Elizabeth Park. Care should be taken at the junction with Groat Road, as this is a busy traffic circle. The Drive peters out just west of the High Level Bridge, but may be regained by crossing 109 Street at 88 Avenue. Saskatchewan Drive is handsomely landscaped throughout its length and presents probably the most attractive views of the city and the river valley.

5. The Legislature and Grounds

The Alberta Legislature and its formally landscaped grounds are a short walk across the High Level Bridge from the campus. The Legislature is open from 9 a.m. to 8:30 p.m. daily during the summer. During the noon hour everyday, the building's carillon gives a brief concert, and the grounds are always a pleasant and quiet place to stroll. Tours of the Legislature leave every hour on the hour.

6. Provincial Museum and Archives

For confirmed walkers, a less common way to reach the Alberta Provincial Museum and Archives is by way of Groat Bridge and an interesting, undulating wooded trail along the west side of Groat Road, a trail which would be especially exciting for children. The trail is muddy and slippery in wet weather, though, and Groat Road itself, a fast, twisting freeway, requires caution in crossing. In springtime, however, the trail passes through lovely brush, through conifers, honeysuckle, and lilacs, and is quite a beautiful place to explore.

BOARD OF GOVERNORS



Norman A. Lawrence

Norman A. Lawrence is serving his second term on the Board of Governors. His first appointment was the the 1973-76 term, when he served as alumni representative. Previously, in 1969-70, he was an alumni representative on the University of Alberta Senate. Now as a Member at Large on the Board of Governors, Mr. Lawrence is the Chairman of the Community Relations Committee and a member of the Executive Committee, the Finance Committee, and the Salaries Negotiating Committee.

In 1973, Mr. Lawrence retired from his prime occupation of twenty-five years as founder, president, and chairman, successively, of Associated Engineering Services Ltd. He retired early, leaving an administrative position so that he could take on other types of activities, such as serving on the Board of Governors for the University of Alberta, and also as a board member of Chieftain Development Company Ltd., the Alberta Opportunity Company, and the University of Alberta Devonian Botanic Garden. He is also chairman of Ponderay Exploration Company.

Mr. Lawrence, whose family has resided in Alberta for almost one hundred years, graduated with a BSc in Civil Engineering from the University of Alberta in 1941. One of his sons is now studying Electrical Engineering, and two of his other three children have graduated from this University, one in Engineering and one in Arts. Watching his children progress through the University, Mr. Lawrence is principally concerned with the standard of instruction available. He says, "... one of the first things I did, first as a Senate member and then as a Board member, was to try to promote the idea that teaching was the prime role of the professor. . . ."

When asked about the purpose of university

education, Mr. Lawrence answered:

"... my philosophy is that a person must learn an economic means of personal survival ahead of the cultural end, or possibly, these things can be carried on simultaneously, but of prime importance, I believe, is that a person must learn, either in this institution or other institutions, a means of economic survival." Mr. Lawrence asserts that "It is the responsibility of the individual to gain sufficient skills so that he becomes a productive member of society and can earn his own living. Second, having gained that, it is up to him to be an intelligent, informed member of society with an appreciation of the cultural aspects of our world."

As the Chairman of the Community Relations Committee, Mr. Lawrence is "deeply committed to getting the best story across" about the University of Alberta. One accomplishment that he is especially pleased with is the short time in which the Community Relations Committee was able to find a Director of Community Relations.

Mr. Lawrence considers "communications" as the focal point of his Committee, and as an important objective of the Board of Governors as a whole. He cited the list of meetings, both completed and pending, between the Board of Governors and the members of the Legislative Assembly, between the Board and the Deans' Council, and continuing contact with other university boards in Western Canada. Communication between authorities is essential, he believes, but also, information must be available for all students and staff at the University who require it. As the Chairman of the Community Relations Committee, Mr. Lawrence is working to achieve these goals both for himself and for the betterment of our University.

PHYSICAL EDUCATION AND RECREATION SPRING AND SUMMER

All staff, students, and alumni presenting current I.D. or privilege cards will be permitted to use all facilities and to borrow equipment available from the Men's and Women's equipment rooms. *Students, non-academic staff, and academic staff who are not members of AASUA* may obtain privilege cards for themselves or for their families at the Athletic Services Office, W-134 Physical Education and Recreation Centre, telephone 432-3365. *AASUA Members* have free privileges, and membership cards can be obtained from the AASUA office, 347 Athabasca Hall, telephone 432-5321. *Alumni* can purchase privilege cards at the Alumni Office, 430 Athabasca Hall, telephone 432-3224. Yearly rates are: alumni family \$50, single alumni \$30.

Facilities for a variety of recreational activities are available: badminton, basketball, volleyball, jogging, squash, handball, racquetball, tennis, weight training, and swimming. The swimming schedules for spring and summer 1978 are listed below. Please note that due to the Commonwealth Games, from 21 July to 30 August, recreational swimming will be permitted in the East Pool only.

RECREATIONAL SWIMMING SCHEDULE

Spring

To 2 July in the West Pool

Adult Swimming

Monday to Friday	11 a.m. to 1 p.m. 4 p.m. to 5:30 p.m. 7 p.m. to 9 p.m.
Saturday and Sunday	1 p.m. to 5 p.m.

Family Swimming

Monday to Friday	12 noon to 1 p.m. 5 p.m. to 5:30 p.m. 7 p.m. to 8 p.m.
Saturday and Sunday	2 p.m. to 4 p.m.

Summer

From 3 to 20 July in the West Pool

From 21 July to 30 August in the East Pool

Adult Swimming

Monday to Friday	11 a.m. to 1 p.m. 4 p.m. to 6 p.m. 7 p.m. to 9 p.m.
Saturday and Sunday	1 p.m. to 5 p.m.

Family Swimming

Monday to Friday	12 noon to 1 p.m. 5 p.m. to 6 p.m. 7 p.m. to 8 p.m.
Saturday and Sunday	2 p.m. to 4 p.m.

PEOPLE

■ Edith Down, Professor Emeritus, Secondary Education, received an honorary Membership Award from the Home Economics Council of the Alberta Teachers' Association in recognition of long and outstanding service in the interests of the profession. The presentation was made at the Annual Convention on 5 May at the Banff Springs Hotel.

■ Eugene Egert, Professor of German, read a paper at the recent meeting of the Rocky Mountain Medieval and Renaissance Association at Salt Lake City.

■ Richard Frucht, Professor of Anthropology, was the keynote speaker at the recently held seminar on Peasant Formation in the Caribbean, sponsored by the Centre for African, Afro-American, and Caribbean Studies, California State University at Northridge.

■ C.C. Nwigwe of the Department of Educational Psychology and V.U. Nwigwe of the Department of Romance Languages gave a joint lecture on "Nigeria: People and Cultures" at Windsor Park School on 18 May. 1978.

■ C.Y. Oh, Associate Professor in the Department of Secondary Education presented a paper at the International Conference of the Association for Programmed Learning and Educational Technology which was held in Wales from 9 to 13 April 1978. The title of the paper was "Teaching a Graphics Course through Programmed Instruction."

■ Helen M. Madill, Associate Professor of the Department of Occupational Therapy, presented the keynote address to the Commission on Education, American Occupational Therapy Association, San Diego, California. The paper, "Occupational therapy: the Canadian model," was co-authored by S. Brintell, Acting Chairman, Department of Occupational Therapy.

■ Benjamin Felson, Professor of Radiology, University of Cincinnati Medical Centre, was the Walter C. McKenzie Visiting Professor in the Department of Radiology, University of Alberta Hospital, 24 and 25 May.

BOOKS

■ Alan L. Bryan, Professor of Anthropology, has edited *Early Man in America: From a Circum-Pacific Perspective*. Published by the Archaeological Researches International, Edmonton, the book is the first of a series of Occasional Papers of the Department of Anthropology.

■ Karol Krotki, Professor of Sociology, has edited a book released by the University of Alberta Press entitled *Developments in Dual System Estimation of Population Size and Growth*.

NOTICES

Notices must reach the Editor by 9 a.m. the Thursday prior to publication. Written notification is necessary

1978 Alberta Achievement Awards

Nominations are now being accepted for the 1978 Alberta Achievement Awards.

Individuals who have made an outstanding contribution in sports, the arts, community service, science, or other fields are eligible for an award. Nomination forms are available from Alberta Culture, Alberta Achievement Awards Program, Floor 14, CN Tower, Edmonton, T5J 0K5. The last date for nominations is 2 September.

International Year of the Child

1979 has been designated as the International Year of the Child. A small group of University faculty members has been serving as an Ad Hoc Committee for the activities which will centre around the topic. They have developed some preliminary plans, but they hope to broaden the base of participation in the planning process before any decisions are made. Anyone who is interested in participating is invited to attend a meeting on 14 June at 3:30 p.m. in 3-15 University Hall.

Musical Director Needed

The Sherwood Park Singers are seeking a qualified person to be Musical Director of a large mixed chorus. The duties of the Director will commence in September 1978. Candidates should apply in writing, providing qualifications, experience, and references to Sherwood Park Singers, 14 Elm Court, Sherwood Park, Alberta, T8A 1J2. For further information, telephone 467-7270.

Fall Kindergarten Program

The Department of Elementary Education Kindergarten will be accepting applications for their fall program. For further information, telephone Carol Deutscher at 432-4604 between noon and 4:30 p.m. or 437-2882 in the evenings.

Mother and Child Yoga

A course in Hatha Yoga designed for the participation of mothers and their young children will be offered beginning 21 June. The purpose of the course is to promote health and fitness activity among young children and to gain information about the teaching of Hatha Yoga to the young child. The project is experimental in nature,

and there will be no instructional fee. Classes will be short, 5:45 p.m. to 6:45 p.m., and each lesson will include simple yoga exercises that the mother and child can do together. The classes will take place on 21 and 28 June and 5 and 12 July. Participants must pre-register. For further information contact Rene Sainsbury, telephone 435-5606 in the evenings.

General Faculties Council Corrigenda

Contrary to the report published in *Folio* (1 June 1978) Council did not elect new members to the Executive Committee of GFC. Council, however, did approve a motion proposed by Dean Adams and seconded by Dean Newbound, that "GFC instruct the Nominating Committee to reconsider its nominations for replenishment of the GFC Executive Committee."

In addition L. Laing of the Department of Community Medicine was not, as reported, elected to the Academic Appeals Committee as an "alternate student member" but as an "alternate staff member." N. Gee, a graduate student in the Department of Chemistry, was elected to the position of "alternate student member" of that committee.

Folio wishes to apologize to the parties concerned for any inconvenience the inaccurate reportage may have caused them.

General Faculties Council Committee Vacancies

The GFC Nominating Committee is seeking nominations for the following committee for election by the GFC.

Ad hoc Committee on GFC Committees and Procedures. Applications are invited from members of the academic staff and students who are interested in serving on this Committee. Members or former members of GFC are particularly requested to reply.

Those people who have suggestions for nominations or who are interested in serving on the above committee are requested to contact the Secretary of the Nominating Committee, 2-1 University Hall, telephone 432-4715. It would be appreciated if a brief vita could accompany any nomination.

Safety Training

Self Contained Breathing Units

On Monday, 26 June, demonstrations on the proper use and maintenance of Levitt Safety Company and Safety Supply Company self-contained breathing units (Survive-Air, Scott, Lear-Ziegler) will be conducted in 559 General Services Building between 1 p.m. to 3 p.m. Any departments having these units in their areas are invited to send personnel to attend the demonstrations. For further information contact Wendy Kinsey, University Safety Training Officer, telephone 432-2680.

THIS WEEK AND NEXT

Listings must reach the Editor by 9 a.m. Thursday one week prior to publication. Written notification is preferred.

15 JUNE, THURSDAY

Grad House

Thursday Night at the Grad House. Open 4:30 p.m. to 10:30 p.m. Refreshments available.

Cinematheque 16

7:30 p.m. *Idi Amin Dada* (France, Uganda, 1975). Directed by Barbet Schroeder. Downstairs, Edmonton Art Gallery. Admission is \$2 for members and \$2.50 for non-members. Tickets available at the door.

Bibliographical Society of Canada

8 p.m. "Prairie Fiction," an address by Richard T. Harrison, Associate Professor of English, presented at the annual meeting of the Bibliographical Society of Canada. Bibliography Room, third floor, Rutherford Library North.

16 JUNE, FRIDAY

Grad House

Friday Night at Grad House. Open 3:30 p.m. to 8:30 p.m. Refreshments available.

Faculty Club

Downstairs. Buffet: prime rib of beef, baked ham, potato, fresh vegetable, salad bar, \$5.50. *Upstairs.* Chef's special: cream of asparagus soup, Waldorf salad, veal scaloppine, noodles, fresh vegetable, dessert table, \$7.95. Also lobster soufflé, \$15, and regular dinner menu. Reservations required.

Cinematheque 16

7:30 p.m. *Idi Amin Dada* (France, Uganda, 1975). Directed by Barbet Schroeder. Downstairs, Edmonton Art Gallery. Admission is \$2 for members and \$2.50 for non-members. Tickets available at the door.

Mime Troupe

8 p.m. The Arte Contemporary Mime Troupe. Centennial Library Theatre. Admission is \$3.50 regular and \$2.50 for students and senior citizens. Tickets available at Woodward's and at the door.

17 JUNE, SATURDAY

Open House at the Power Plant

10 a.m. to 4 p.m. The Open House at the Power Plant, the new Graduate Student Social Centre, will give everyone an opportunity to see its state of development before the official opening in the fall.

Jazz Concert

2:30 p.m. A jazz concert with the Bob Stroup Quintet featuring P.J. Perry. Front Terrace, Edmonton Art Gallery Admission is free.

Faculty Club

Downstairs. Saturday buffet: Cornish game hen, rice, fresh vegetable, salad bar, dessert table, \$5.50.

Upstairs. Chef's special: antipasto, rack of lamb, potato, fresh vegetable, dessert table, \$7.95. Also lobster soufflé, \$15, and regular dinner menu. Reservations required.

Cinematheque 16

7:30 p.m. *Idi Amin Dada* (France, Uganda, 1975). Directed by Barbet Schroeder. Downstairs, Edmonton Art Gallery. Admission is \$2 for members and \$2.50 for non-members. Tickets available at the door.

Mime Troupe

8 p.m. The Arte Contemporary Mime Troupe. Centennial Library Theatre. Admission is \$3.50 regular and \$2.50 for students and senior citizens. Tickets available at Woodward's and at the door.

18 JUNE, SUNDAY

Cinematheque 16

2 p.m. *Psycho* (United States, 1960). Directed by Alfred Hitchcock and starring Anthony Perkins and Janet Leigh. Downstairs, Edmonton Art Gallery. Admission is \$2 for members and \$2.50 for non-members. Tickets available at the door.

Plumbers Union

2:30 p.m. The Plumbers Union in concert, featuring baroque music interspersed with blues, jazz, and dance music. Centennial Library Theatre. Admission is free.

Bette Davis Film Series

4 p.m. and 7 p.m. *The Corn is Green*. Provincial Museum. Admission is free.

21 JUNE, WEDNESDAY

Citadel/National Film Theatre

7:30 p.m. *The Adalen Rios '31* (Sweden, 1969). Directed by Bo Widerberg and starring Peter Schildt and Kerstin Tidelius. 9:30 p.m. *Joe Hill* (United States, Sweden, 1971). Directed by Bo Widerberg and starring Thommy Berggren and Anja Schmidt. Zeidler Hall, Citadel Theatre. For ticket information, contact the Citadel Box Office, telephone 425-1820.

22 JUNE, THURSDAY

Entomology Seminar

4:30 p.m. "Chemical regulation of feeding in *Rhodnius Prolixus*," with speaker J.J.B. Smith of the University of Toronto. 62 Athabasca Hall Annex.

Grad House

Thursday Night at the Grad House. Open 4:30 p.m. to 10:30 p.m. Refreshments available.

Cinematheque 16

7:30 p.m. *Sallah* (Israel, 1966). Directed by Ephraim Kishon and starring Topol and Gila Almagor. Downstairs, Edmonton Art Gallery. Admission is \$2 for members and \$2.50 for non-members. Tickets available at the door.

Citadel/National Film Theatre

7:30 p.m. *The Adalen Rios '31* (Sweden, 1969). Directed by Bo Widerberg and starring Peter Schildt and Kerstin Tidelius.
9:30 p.m. *Joe Hill* (United States, Sweden, 1971). Directed by Bo Widerberg and starring Thommy Berggren and Anja Schmidt. Zeidler Hall, Citadel Theatre. For ticket information, contact the Citadel Box Office, telephone 425-1820.

23 JUNE, FRIDAY

Grad House

Friday Night at Grad House.
Open 3:30 p.m. to 8:30 p.m. Refreshments available.

Faculty Club

Downstairs. Buffet: prime rib of beef, baked ham, potato, fresh vegetable, salad bar, dessert table, \$5.50.
Upstairs. Chef's special: gazpacho, mimosa salad, chicken ballotines, potato croquettes, fresh vegetable, dessert table, \$7.95. Also regular dinner menu. Reservations required. Entertainment: The Committee.

Citadel/National Film Theatre

7:30 p.m. *Joe Hill* (United States, Sweden, 1971). Directed by Bo Widerberg and starring Thommy Berggren and Anja Schmidt.
9:30 p.m. *The Adalen Rios '31* (Sweden, 1969). Directed by Bo Widerberg and starring Peter Schildt and Kerstin Tidelius. Zeidler Hall. For ticket information contact the Citadel Box Office, telephone 425-1820.

Cinematheque 16

7:30 p.m. *Sallah* (Israel, 1966). Directed by Ephraim Kishon and starring Topol and Gila Almagor. Downstairs, Edmonton Art Gallery. Admission is \$2 for members and \$2.50 for non-members. Tickets available at the door.

24 JUNE, SATURDAY

Faculty Club

Downstairs. Barbecue your own: steak (\$6.50), foot-long hot dogs (\$3.50), potato, fresh vegetable, salad bar, dessert table.
Upstairs. Chef's special: velvet consommé,

cucumber salad, prime rib of beef, potato, fresh vegetable, dessert table, \$7.95. Also regular dinner menu. Reservations required.

EXHIBITIONS AND PLAYS

University Art Gallery and Museum

Continuing. An exhibition of Indian and Inuit artifacts and clothing from the Edwards and Lord Collections.

Edmonton Art Gallery

Continuing. "Certain Traditions," an exhibition of recent British and Canadian art.
Continuing. An exhibition of watercolors by Sheila Girling.

Provincial Museum

Continuing. "Damaged Documents," examples of documents and photographs exhibiting the extent and kinds of damage which can occur to documents.
Continuing. "The Spirit of the Windships," an exhibition on the ships and ship-building of the nineteenth century.
Continuing. "The Art of the First Australians," aboriginal paintings, sculptures, and artifacts.

Foyer Gallery

Continuing. An exhibition of the works of Marushka Kurylo-Finley. Centennial Library.

Devonian Botanic Garden

A collection of native and introduced plants used for teaching and research, located 9.7 km west on highway 16 and 14.5 km south on highway 60. Open from 1 p.m. to 6 p.m. daily.

Centennial Library

An exhibition of black and white photographs by Martin Thompson. Photography Gallery.

Alberta Barter Theatre

From 21 June. William Gibson's *Two for the Seesaw*. Outdoors in the courtyard beside Corbett Hall at 9 p.m. For ticket information and show times contact the Barter Theatre, telephone 432-2495.

Churchill Square Players

17 June. *The Return of the Frog Prince*, a children's play presented by the Churchill Square Players. Admission is free. For show times and further information, telephone 423-2331, extension 217.

POSITIONS VACANT

POSITIONS ON CAMPUS**Academic Positions****Administrative/Personnel Officer**

An Administrative/Personnel Officer is required by

the Department of Chemistry. The primary duty of this position is overseeing the personnel function of one of the University's largest departments. This includes selection of staff, conducting performance evaluation, review and recommendation of staffing needs, and working closely with the central personnel function in wage and salary administration. Other general administrative duties include processing of Post Doctoral Fellow, Research Associate, Graduate Assistant, and non-academic appointments made against trust or research grants. Other related duties will be assigned as required. The successful applicant will be a university graduate possessing several years of personnel-related experience. A layman's knowledge of accounting would be an asset. Interested persons should submit a letter of application and résumé to D.J. MacKenzie, Senior Professional Officer, Department of Chemistry, University of Alberta, T6G 2G2.

Administrative Officer

An Administrative Officer is required for the Department of Botany. To work closely with the Chairman and staff in meeting the personnel and administrative requirements of the Department including the management of the office and stores, staffing, accounting, purchasing, budgeting, timetabling, student registration, graduate student admissions, and liaison with other departments and administrative offices at the University. A BSc in Biology, or equivalent, plus administrative experience, preferably in a University Biology Department is required. Starting salary is from \$14,824 per annum (under review) commensurate with qualifications and experience. The University offers a comprehensive fringe benefits package. Please submit a comprehensive résumé with names and addresses of three references by 30 June 1978 to:
Dr. P.R. Gorham, Chairman
Department of Botany
B414 Biological Sciences Centre
University of Alberta
Edmonton, Alberta
T6G 2E9

Non-Academic Positions

To obtain further information on the following positions, please contact Personnel Services and Staff Relations, third floor, SUB, telephone 432-5201. Please do not contact the department directly. Positions available as of 9 June. Salaries presently under review.

Bookkeeper II (\$361-\$439, half time)—Home Economics
Cashier (\$645-\$753)—Bookstore
Library Clerk II (\$645-\$753, trust)—Legal Resource Centre, Extension
Clerk Typist II (\$645-\$753)—Computing Services; Surgical Medical Research Institute; Student Awards Office
Clerk Steno II (\$645-\$780)—Industrial and Vocational Education; Anatomy; Canadian Institute of Ukrainian Studies; Faculty of Nursing; Entomology
Dental Assistant (\$671-\$813)—Dentistry, Oral Biology
Clerk Typist III (\$698-\$845, term)—Home Economics
Clerk Typist III (\$698-\$845)—Soil Science; Office of the Registrar
Senior Clerk (\$698-\$845)—Parking Services; Housing and Food Services, HUB
Clerk Steno III (\$722-\$878, trust)—Biochemistry
Clerk Steno III (\$722-\$878)—Economics; Electrical Engineering; Mineral Engineering; Faculté Saint-Jean; Office of the Registrar
Programmable Typewriter Operator II (\$753-\$916)—Personnel Services and Staff Relations

Student Record Processing Clerk (\$753-\$916)—
Faculty of Education
Administrative Clerk (\$845-\$1,036)—Physical Education
Library Assistant II (\$845-\$1,036)—University Archives
Computer Assistant (\$645-\$780)—Computing Services
Laboratory Assistant II (\$671-\$813)—Provincial
Laboratory, Edmonton
Storeman I (\$698-\$845)—Technical Services
Building Services Worker II (\$753-\$916)—Housing and
Food Services, HUB
Technician I (\$845-\$1,036)—Art and Design
Food Service Worker IV (\$878-\$1,080)—Housing and
Food Services
Draftsperson I (\$878-\$1,080)—Physical Plant,
Engineering
Maintenance Man II (\$916-\$1,127)—Housing and
Food Services
Computer Operator II (\$954-\$1,175)—Computing
Services (two positions)
Laboratory Technologist I (\$954-\$1,175)—Provincial
Laboratory, Edmonton (two positions)
Technician II/III (\$954-\$1,337)—Biomedical
Engineering and Applied Sciences
Art Technician Demonstrator I (\$1,036-\$1,280)—Art
and Design
Administrative Assistant (\$1,080-\$1,337)—Computing
Services; Universities Coordinating Council
Technician III (\$1,080-\$1,337)—Biomedical
Engineering and Applied Sciences
Engineering Technologist III (\$1,175-\$1,458)—Physical
Plant, Engineering
Nurse Practitioner (\$1,337-\$1,663)—Pediatrics

The following is a list of currently available positions in the University of Alberta Libraries. The bulletin board postings in the Library Personnel Office, 516 Cameron Library, should be consulted for further information about position requirements and availability.

Library Clerk III (\$698-\$845)—Cataloguing
Library Assistant II (\$845-\$1,036)—Education

ADVERTISEMENTS

All advertisements must be received by 9 a.m. the Friday prior to publication. Rate is 15 cents per word for the first week and 5 cents per word for subsequent weeks ordered before the next deadline. Minimum charge is \$1. Ads must be paid in advance and are accepted at the discretion of the Editor. We regret that no ads can be taken over the telephone. For order forms or further information, telephone 432-4991.

Accommodations available

For sale by owner—1,756-square-foot home in executive Blue Quill. Fully carpeted, four-bedroom split level home includes 2½ baths, main-floor family room with tyndalstone fireplace and patio doors, bright, airy kitchen, spacious living and dining room, and impressive entrance foyer. This beautiful home also has a double garage and is located on a large landscaped lot. Telephone 436-3617 or 425-0110, extension 205.
For rent—Fully furnished three-bedroom house in north Windsor Park; study, family room, game room, fireplace, garage, large fenced yard. From 15 August 1978 through 15 August 1979. \$600 monthly. 439-3509.
For rent—new three-bedroom house. West end, near hospital, school and bus route; available for immediate occupancy. 484-8322, evenings.
For rent—1 August for one year. Furnished two-bedroom house near University. Well-treed

and situated on quiet corner. \$450 monthly. No pets. References. 434-4588, evenings.
Renting—July - August. Furnished condominium; two bedrooms, study, fenced yard, garage. Twenty minutes to campus. 432-6316; 462-0787.
Lease—August 1978 - August 1979. Modern fully furnished executive house. References, damage deposit required. No pets. 435-6686.
Owner selling—1,150-square-foot three-bedroom semi-bungalow. 10718 67 Avenue. Appliances and garage. \$65,9000. 432-3584 (days), 434-0190 (evenings).
Renting—Belgravia: four-bedroom house; two-car garage, breezeway, two fireplaces, beautifully furnished, two bathrooms, study, family room, large kitchen, dining room, living room, playroom, five appliances, wine cellar, mature trees, private patio, lawn mower, bicycles. 4½ minutes University; 14 minutes downtown. \$700 monthly. Available one year, September 1978. For appointment telephone 434-9784. No agents.
For sale—two-bedroom, furnished, winterized cottage on lake-front lot at Sandy Beach. Has power, gas, and telephone. For further information telephone Wilma at 432-8519, days.
For sale—1,800-square-foot two-storey in Laurier Heights. Four bedrooms, double garage. 483-6939.
For rent—1 July: one-bedroom apartment, beautifully furnished, carpeted; paved parking. Faculty members. \$305. Caretaker, Apartment 16, 10839 University Avenue.
For rent—Country home, forty minutes from University; 22 acres, 1,075 square feet, fireplace (free firewood), carpeted, private telephone, double garage and automatic door opener; large deck overlooking ravine; school bus one block away; children and pets welcome. \$500 monthly; \$450 damage deposit. One-year lease and references. Available immediately. June Donaldson, 426-5002 (days); 1-789-3800, evenings.
For rent—new three-bedroom house; twenty minutes to University. \$650 for summer session. Also available for 1978 - 1979 winter session. \$450 monthly. Telephone 474-5952 evenings, or write: 4104 122 Avenue, Edmonton.
House rental—beautiful three-bedroom townhouse condominium, very handy to University. \$400. Telephone 429-5065.
For sale—Parkallen semi-bungalow in quiet area; 1,200 square feet, three bedrooms, 1½ baths; developed basement with fourth bedroom, single garage with carport. No agents please. 434-3038.
Wooded vacation lot near Shushwap Lake. \$14,500. Paved road; utilities available. 437-0118.
Lansdowne—four-bedroom home, fully furnished. Lovely garden and sundeck. July and August. Need someone to love my plants. 435-4267.
For rent—mid-July through August. Furnished house, Greenfields. \$450 for six weeks, includes utilities, care of cat and yard. References and damage deposit. 434-9635; 432-5009.
For sale—ten minutes from University. Downtown luxury highrise condominium; two large bedrooms, two bathrooms; very reasonably priced. Ivor Williams, Royal Trust. Telephone 435-4869; 433-7715.
For sale or rent—North Mill Woods: three-bedroom end unit; carpeted, 1½ baths, carport. Near school, shopping, bus. 462-2182; 432-5805.
Renting—Parkview. One year from 31 August. Executive bungalow, furnished, three-four bedrooms, fireplace, main floor family room, adjacent screened porch and deck, developed basement, all modern appliances; excellent west-end location near schools, playground, bus, and shopping. \$750. 483-6904.
For rent—four-bedroom two-storey house in Duggan; unfurnished or semi-furnished. 1 September 1978

to 31 August 1979. Damage deposit and references. \$475. 434-4710; 432-4944.
For rent—acreage (suitable for horses) plus two-bedroom, completely remodelled house. Forty-five minutes from University at Millet. \$325 monthly. Available either July or 1 August. Please telephone 435-6514 after 6 p.m.
For rent—furnished four-bedroom split level, main floor family room with fireplace; rumpus room, double garage. From 1 August 1978 to 31 July 1979. \$650 monthly. 434-4665.
For rent—1 September - 30 June 1979: furnished four-bedroom house; Riverbend, across from school; direct bus, ten minutes to University. Non-smokers. \$575 monthly plus damage deposit. 436-0522.
For rent—2,800-square-foot home in Belgravia. Four bedrooms, 1½ baths, fireplace, new carpets, drapes. \$650 monthly. Immediate occupancy. To view, telephone 466-5246 evenings.
For rent—two years from August: three-bedroom, two storey, side-by-side. Furnished. Petrolia. 435-1916 after five.
For rent—eight months from 1 September 1978. Fully furnished two-storey three-bedroom home in Grandview Heights. No pets. \$550 monthly. Telephone 434-3272 after five.
For rent—University area: attractive two-bedroom home for reliable tenants. Clean, carpeted; fridge, stove included. Lovely large fenced yard; garage. Available 1 July. Non-smokers. 462-5437.
For rent—one year from mid-August: four-bedroom furnished duplex. Good bus service to University. \$500 monthly. 432-5342; 435-3345.
For rent—University area. One-bedroom basement suite, partially furnished, drapes, appliances. Non-smokers please. 462-5437.
To lease—from 1 August 1978 to August 1979: 2,000-square-foot four-bedroom furnished home on quiet crescent in Aspen Gardens. References required. \$600. 432-4270 (office); 434-0248 (residence).
For sale—acreage, by owner: 10.65 acres south of Sherwood Park; 1,400-square-foot redecorated older home; barn, corrals, good pasture, trees.. In friendly sub-division. 467-0977.
For sale—price reduced. Laurier Heights, with view. Ideal home for large family. Take smaller house in trade. Resi Richter, 483-9432; 455-4135. Weber Bros.
For rent—one-bedroom apartment near University; furnished. 30 June - 31 July. \$250. Telephone 433-4885 before 9 a.m.
Wanted—persons to share large house. Telephone 454-7323 after four.
To lease—one year beginning 1 July 1978. Three-bedroom condominium apartment. Superb view river valley. Near University. 434-6188, evenings.
For rent—four-bedroom bungalow, Greenfields; 1½ baths, rumpus room, den, double garage, all appliances, furnished, fully landscaped. Special appeal for musicians. \$450 monthly. 1 August 1978 to 31 July 1979. Telephone 434-9264 or 432-2425.
For sale—acreage (three acres) with cedar siding, 1,552-square-foot ranch house; three bedrooms, two fireplaces, separate dining, kitchen, study, and finished basement; 3½ miles east of Sherwood Park. Appraised \$110,000. Reasonable offer. No agents. 464-0285, 483-6723, evenings after five or Saturday, Sunday.
For rent—Riverbend. July and August. Modern fully furnished three-bedroom apartment. Rent negotiable; references required. Mr. Bellas, 477-4296 (days); 436-7623 (evenings).
For sale—two-bedroom condominium in immaculate condition. Features large dining room, kitchen with walk-in pantry and breakfast nook, ample

storage space. Many other amenities. Within easy access of University. Telephone Denise Rout, 432-7398; 436-5250. Spencer Real Estate.

For sale—Garneau (11013 84 Avenue) two-bedroom bungalow. \$66,900. Telephone 433-2813 or 439-3309. Listing expires. Now priced less commission.

West-end three-bedroom duplex condominium; largest yard, facing berm; driveway-parking. Immaculate. 487-2462; 477-7297.

For sale by owner—four-bedroom semi in Westmount. Quiet street, large fenced lot, shake roof, two bathrooms, garage, separate dining room, carpet throughout; 3 km to University. Ideal for family. Telephone 452-7909 for viewing.

For sale—Garneau: fully restored two-storey, one block from Law Centre; 1,900 square feet, three bedrooms, three bathrooms, living room, dining room, breakfast room, vestibule, hardwood floors, developed basement, two fireplaces, balcony, patio, cedar fence, garage. \$99,000. Offers. Owner, 433-2813, after five.

For sale—reduced for quick sale: West-end three-bedroom bungalow with possible basement suite. Near all amenities. Resi Richter, 483-9432; 455-4135. Weber Bros.

Accommodation wanted

Visiting researchers require three-four-bedroom house or apartment, completely furnished, for 1 August. Please telephone Pat Burns at 435-6798 after six.

Married law professor (no children or pets) requires accommodation for coming academic year. Going on sabbatical? Please contact Professor Eugene Meehan, 1835 Lakeshore Drive, Dorval, Montreal. (514) 631-5946.

Visiting professor requires house or apartment for self, family (one child). September 1978 - December 1978. References available. Will consider exchange. Telephone Bill Taylor 288-5164 (Calgary) collect.

Visiting professor and wife require fully, or partly, furnished one-bedroom accommodation for six-seven months beginning 1 September. 435-0374.

Responsible married couple require small house or apartment, from September. University area. Willing to do upkeep. 466-8831; 453-2231.

Automobiles and accessories

1978 VW Rabbit, diesel, custom two-door, 3500 km, green, new value, undamaged. 432-3414; 963-3238.

1973 Toyota Corolla two-door, 1600 engine, four speed, new summer and winter tires, new paint. Very good condition. 469-0583.

1972 Ford station wagon, immaculate, 65,000 miles, roof rack, automatic, radio. Must be seen; owner anxious. Offers to \$2,400. 1972 Toyota MKII automatic, radio, approximately 4,000 miles on rebuilt engine. Offers to \$1,100. Art, 432-3263; 483-7138.

1972 Chevrolet Impala, 56,000 miles, fully equipped, excellent condition. 439-5336.

Starcraft 8 hard-top camper. 988-5127.

1972 Ford Cortina two-door; 2000 engine; 65,000 miles. \$350. 434-0517; 432-3579.

1970 Volvo. Excellent body and mechanically sound. One owner. 432-8196; 453-2231.

Goods and services

Imagine owning some Medieval imagery. Selling elegantly framed brass rubbings from England. Shown by appointment. 434-9784.

Experienced typist. Variety of type styles, symbols. Quality work. 435-5006; 435-4407.

Seabri Sailboats—Seaspray (15-foot catamaran) and Kolibri (12-foot monohull). 11408 58 Avenue. 434-3309.

Private lessons—piano, bass, guitar. Telephone 436-0176 after five.

Exterior painting. Highly experienced, excellent references. Telephone 435-7157.

Expert typing—theses, etc. 455-0641 evenings.

Antiques from England. Furniture—all periods: tables, chairs, sideboards, cabinets, stools. Porcelain: Derby, Doulton, Wedgwood, Dresden, Oriental, Art Nouveau, art deco, commemoratives, cloisonné, dolls, clocks, jewellery, gifts, collectables. We also buy these items. Mary Goulden Antiques. From 137 Avenue and 50 Street, drive five miles northeast, then 1½ miles east to Horsehill Hall. 1-8 p.m., Thursday, Friday, Saturday, Sunday. 973-3656 or 475-8139.

T and T Concrete—specializing in driveways, patios, and sidewalks. 475-1670.

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Leaving Edmonton? Need space for furniture, car, etc.? Mini Storage. From \$5 weekly. 425-1723; evenings, 467-0586.

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Dressmaking and alterations. Elizabeth Hamilton. 428-6162.

Typing—when you have correspondence, reports, etc., that need typing, telephone G.T. Typing, 484-1004 for a professional job at reasonable rates.

Books—old and out-of-print, bought and sold. Norwood Books, 11302 95 Street. 474-4446. Ken Jackson, proprietor.

Leaving—must sell: teak table, six chairs; sofa, chair, coffee table, end table, dishwasher, humidifier, TV, miscellaneous. 483-0709.

Canoe—fibreglass Slalom C2. 435-2919 evenings.

Self-cleaning stove; 20-cubic-foot fridge, large metal office desk, washer and dryer. 435-4368.

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Self-cleaning white 40-inch range. Excellent condition. \$250. 483-6545.

Large Hitachi washer/spin dryer. Dianne, 432-4246; 479-0576.

Babysitter for July - August. My home. 435-1655 after 5 p.m. Anytime weekends.

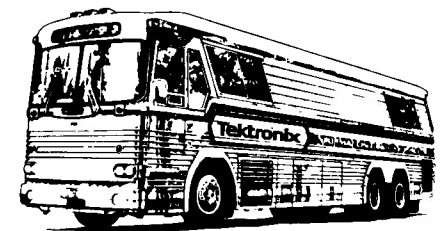
Yamaha upright piano, dull ebony finish. Current retail price \$2,650; selling for \$2,000. Telephone 433-9669 from 5 - 7 p.m.

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